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Veterinary Notes on "Our Second Front"

MAURICE PANISSET, V. M.*
La Trappe, Quebec

THE AMERICAN troops have gone to liberate French North Africa from the servitude of the Armistice of 1940. Renewing the fraternity of the armies of 1917, soldiers of the United States and of France are fighting side by side to drive the last vestige of Italo-German armies from Tunisia.

Having had the honor of being an officer in the veterinary corps of the French troops occupying Morocco, I can agree that the readers of the JOURNAL would be interested in the peculiarities of livestock production, animal pathology, and the veterinary organization of that country. I trust that the information will be useful to our *confrères* who may have occasion to participate in the American Expeditionary Forces.

Maurice Panisset, V.M.

Professor Maurice Panisset (alumnus of Alfort), Director of Studies, Ecole de Médecine Vétérinaire, Université de Montréal, La Trappe, Quebec, who at the request of the Journal has consented to inform our veterinary service on his views of the African front where French and American troops are again arrayed side by side in the fight for liberté, fraternité, egalité.

PROFESSIONALS PACIFY HOSTILE GROUPS

Veterinarians played an important rôle in the early plan of pacifying and colonizing Morocco. In the beginning of the protectorate, it was the military veterinarians who taught the natives the benefits of veterinary medicine and aroused their attention to rational methods of breeding their animals. Physicians and veterinarians were the first artisans and the symbols of the civilizing effect of France in its oversea empire. In Tunisia, a veterinarian, Thomas, is credited with having discovered one of the principal resources of that colony — the bearings of phosfates.

In Morocco, veter-

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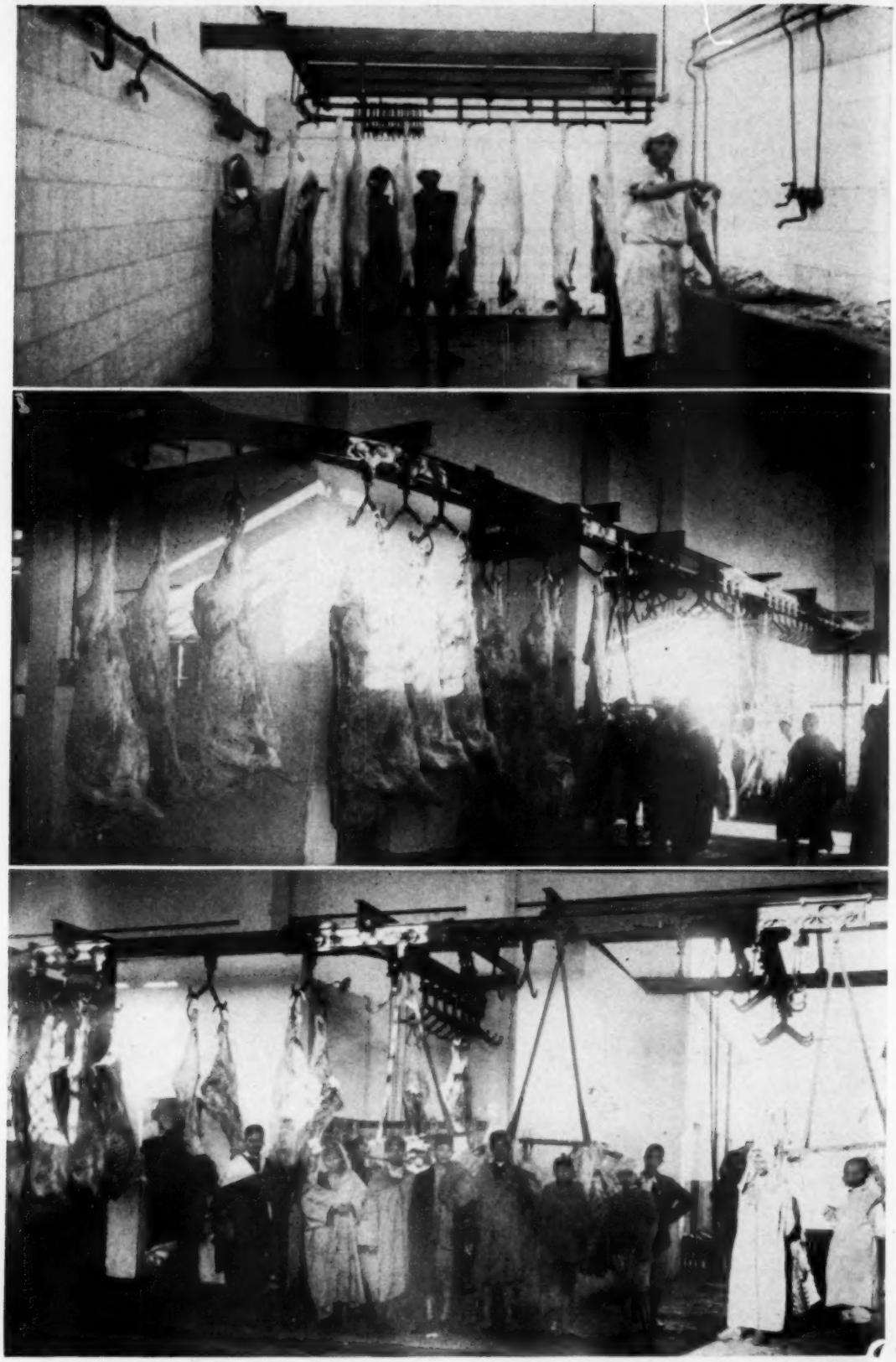
*Director of Studies, Veterinary Department, University of Montreal.



—Photo by the author, 1932

Fig. 1—Scenes at the municipal abattoir of Rabat, showing the modern, sanitary equipment installed and operated under the direction of the Service d'Elevage. Routine meat inspection of the European standard is conducted by the French colonial veterinarians. The upper picture depicts the sanitary status, the middle is a view of the sales room, and in the bottom picture the workers are posing for the camera.

inarians share the respect the natives have for the physician—*le toubid*. The respect extends to the *toubib el haoud* (equine doctors). When Morocco had but partly submitted, and many tribes fought the invasion by France ferociously, it often happened that physicians and veterinarians were not challenged by the natives belonging to hostile groups. The veterinarians never refused professional service to those who called them. Thus, they could enter with full security where other Frenchmen would have been massacred. *What finer homage was ever paid to the value of our profession?*

In caring for man and animals, physicians and veterinarians gained the confidence of the natives, convinced them of the amicable intentions of France, and made them comprehend how much their lives would be ameliorated through French occupation. Physicians and veterinarians often facilitated peaceful penetration of vast territory in lieu of bloody military operations.

Marshall Lyautey, who gave Morocco to France and won the friendship of his old enemies, understood the important rôle of veterinarians in organizing the country. He regarded them as one of his most direct councils. It was they who reorganized livestock breeding in Morocco and ended the high mortality in cattle.

LE SERVICE DE L'ÉLEVAGE (The Animal Production Service)

To understand the present organization of the livestock industry of Morocco, one must compare it with the time of early French occupation.

As soon as a region was pacified by the Army, the protectorate organized native veterinary consultations with veterinary corps officers in charge, who were directed to give free care of animals to the natives by means of specially organized infirmaries and native assistants. They were charged with the inspection of meat destined for civilian consumption and with collecting information on breeding customs and existing diseases. When the territory had completely yielded, the Army ceded its place to civil administration and in time, a civilian service assumed the functions of the veterinary corps. These veterinarians, designated inspectors of animal production, are chosen by competitive examinations. After a period of probation on the veterinary and zoötechnic problems of Morocco and the language of the natives—Arabic and Berbera—they are charged with supervising the veterinary service of a stated district. They receive a fixed salary, are provided with lodging, and allowed an assistant. They are reimbursed in part for the original cost and replacement of their automobile. Professional material is furnished by the protectorate. After two years, they may visit France with their families. The functionaries of the protectorate are directed to assure free veterinary service for the natives, and organize the application of regulations pertaining to contagious diseases and inspection of meat. They are entitled to collect fees for service rendered to animals belonging to European colonials.

Fig. 2—One of the animal infirmaries installed and operated throughout Morocco by the veterinarians of the Service d'Elevage, for the purpose of caring for the ailing animals of the natives and for instructing native aides on modern medical practices. Monsieur le Docteur Vétérinaire is inspecting the forefoot of a lame animal.

This organization has given excellent

results. The conditions and guarantees offered are sufficient to attract and retain a personnel of the first order. The service is directed by the chief of animal production (élevage) service and laboratories at Casablanca, which, under the direction of an eminent scientist (H. Velu) who has occupied that position since its creation, has added materially to the knowledge of Moroccan animal pathology and methods of animal-disease control in that country. The regression of a number of diseases and amelioration of breeding methods are already observed in the remotest parts of the colony.

NATIVE ANIMAL PRODUCTION

The Europeans of the colonies have organized modern breeding methods which have been improved from year to year in the more favorable regions. In general, the animals are French breeds faced with problems of acclimatization and the particular susceptibility of imported animals to diseases of native animals. Native breeding is more important and much more extensive. As the most primitive methods are still practiced, the Service is, however, faced with secular prejudices and native indolence in attempting to institute better methods.

Fig. 3—The country butcher of Morocco operating before watchful bystanders—contrast to the sanitary abattoir installation shown in fig. 1. Nevertheless, respecting the doctrines of the Koran and Holy Bible, animals slaughtered for human use must "be without blemish."

Morocco has a near tropical climate. It has but two seasons: the rainy season from November to May, and drought and heat during the remaining months. The lack of water and herbaceous vegetation during a large part of the year profoundly affects animal breeding and pathology. There are no hogs except in the environs of cities which comprise a notable percentage of the population. Because the Mussulman's Koran prohibits the eating of pork, the raising of that animal is repugnant. The Moroccan raises horses, camels, cattle, and sheep which live semi-free during the day from one end of the year to the other. At night, they are piled into an outdoor enclosure, fenced with thorny shrubs like cactus. The native is naturally improvident and negligent. Except for the horses, he never dreams of collecting reserve forage. The other animals must find their own subsistence, which is plentiful enough during the rainy season, but leaves many to starve during the dry period. To ameliorate this situation, the protectorate has started irrigation projects and encourages the planting of crops which resist drought. To a certain extent, these drought-resisting species provide pasturage, which if not rich, is preferable to desolate steppes where animals hunt in vain for nourishment in summertime. Males and females remain together and breed without surveillance. Cows are kept until they are sterile and incapable of producing milk. Castration, especially of horses, is seldom practiced.

PATHOLOGY

The climate, lack of hygiene, and the difficulty of enforcing sanitary regulations lead to numerous microbial and parasitic diseases. It is well to recall these should exchange of livestock with that country

become more intense. The numerous publications of H. Velu and his coworkers, and those of the Pasteur Institute of Casablanca give precise information about their existence. It is worth knowing, however, that the serious diseases prevalent in other regions of the African continent are unknown in Morocco. *Rinderpest, bovine contagious pleuropneumonia, horse sickness,* and *heart water* are not encountered; *tuberculosis* and *brucellosis* are rare On the contrary, *anthrax, blackleg,* and in general the *gas gangrenes* strike cattle severely, and the same may be said of *hemorrhagic septicemia, epizoötic lymphangitis,* and *contagious agalactia. Foot-and-mouth disease* has appeared several times in Morocco as in other regions of North Africa. *Hog cholera* exists on the farms of Europeans but the damage caused is limited by the methods of vaccination made possible by the Pasteur Institute of Algeria. *Rabies* is particularly prevalent because large numbers of dogs run free and wild carnivores are numerous.

Fig. 4 — Native bred Anglo-Arabian and his jockey, prize winners at the Khemisset race course, are proofs of the Moroccan's devotion to horsemanship, horse breeding, and the "sport of kings." Many "gentleman farmers" of the United States have imported horses of this breed in recent years with the intention of breeding Arabian saddle horses. Some of them on arrival are affected with the deficiency disease mentioned by the author.

Rabies vaccine developed at the Pasteur Institute of Tangier by Remlinger and Bailly is widely employed. Systematic vaccination is encouraged by the Service, although the sanitary legislation of metropolitan France does not sanction rabies vaccination.

Dourine is prevalent in Morocco. Its propagation is facilitated by unregulated breeding and the objection to the castration of horses by the natives.

Trypanosomiasis of camels and *piroplasmosis* of sheep cause heavy losses. The former is called *el debab.* Systematic chemotherapy for these two affections is effective where it can be practiced.

Fig. 5—Sale of asses at the market in Isni N'Taout. While the sale is going on (foreground) great bands of this genus of solipeds are herded on the hillside. Regardless of the deteriorating effect of unmanaged breeding practices, numbers do not seem to be forfeited.

Internal parasites are favored by climatic conditions. The animals infect themselves in the fall, after the dry season, when they find water in abundance. *Strongylosis* and *distomiasis* cause grave damage. Most of the carcasses examined at abattoirs show an abundant and varied parasitism. *Cysti-*

cercus of cattle is also of frequent occurrence.

Nutritional diseases must also be taken into account. Hunger makes animals eat toxic plants and avitaminoses are common. Moreover, animals feeding in regions rich in phosfates develop a special affection known as *darmous* which has been well studied by H. Velu, chief of the Service.

The veterinarians of Morocco meet all of these problems with the enterprising spirit characteristic of the French personnel who labor for the protectorate. They are given all the necessary encouragement by authorities who have understood for a long time how utilitarian veterinarians are in the economic and hygienic organization of a country.

LETTER OF TRANSMISSION (TRANS.)

To the Editor:—

Pursuant to your letter of December 2, I submit the text of an article in French and several photographs from which you may choose those found to be convenient.

It has been a pleasure to write an article which recalls very agreeable days spent in a country of which one always retains pleasant memories after having made its acquaintance.

The French can be thankful to the Americans for taking their place among the people who fight those who have tortured France. . .

In writing this article I found various Moroccan veterinary publications which are at the disposition of those who may be interested in them.

I beg you to believe in my most devoted sentiments. s/M. PANISSET, *La Trappe, Que.*

Arab, with his two sons, visiting his wife who is under treatment in an American evacuation hospital somewhere in Africa, January, 1943.

Summer Milk: Grass-Juice Factor

It was the custom of the early Swiss settlers to store, for the next winter's use, butter made from milk of cows enjoying the lush springtime pasture. The superior quality of such milk was determined by longtime experience, but the cause of the superiority was not understood until recent years or months. It remained for the Wisconsin Agricultural Experiment Station (Jasperson, 1941) to discover the "grass-juice" factor of cows' milk which probably accounts for that age-old practice. The mill of experience grinds slowly, but it does grind fine.

Food Poisoning

Commenting on the poisoning of 16 guests of a New York City hotel by eating Hollandaise sauce, *Health News* (Albany, June 29, 1942) explains that "Presumably somebody with a staphylococcus infection got some of the germs into this stuff and then they kept it setting for several hours at a warm temperature. Of course, the germs multiplied and gave off their toxins and that's what the guests got; the poison."

Here is the text for a sermon on food inspection, that is, the inspection of food having the high cultural potential of most foods of animal origin—a lesson on the supervision of every step of manufacture rather than looking at the outside of a glass jar or tin can and guessing at what the contents holds out to the eater.

The article also points out the futility of subjecting food handlers to a Wassermann test and not insisting upon the washing of their hands—then there's the matter of refrigeration, and so on through those understandable conditions responsible for toxic accidents from food. No one has ever been known to have contracted syphilis by eating nor, barring trichinosis, has there ever been a post-prandial catastrophe from food not poisoned by incubation. "That just goes to show," this author says, "the sort of thing they ought to guard against in these public eating places." Looking at the animal and its fresh carcass is but a part of food inspection.

Observations on Vibrio Foetus Infection in Cattle

W. N. PLASTRIDGE, B.S., Ph.D., and L. F. WILLIAMS, B.S., M.S.
Storrs Agricultural Experiment Station
Storrs, Connecticut

THE ORGANISM *Vibrio foetus*, was described, named, and established as an etiological agent in bovine abortion by Theobald Smith and his associates[1-6] during the period 1918-1923. A similar, if not identical, organism was found by McFadyean and Stockman[7] in 1913 to be the cause of abortion in ewes. Subsequently, the occurrence of vibrionic abortion in sheep and cattle in the United States has been reported by several investigators. The disease was observed in sheep in New York state by Carpenter[8] and Baker and Stone,[9] in Montana by Welsh and Marsh,[10] in Illinois by Graham and Thorpe,[11] and in Michigan by Ryff.[12] *V. foetus* was found in four bovine fetuses examined by the Pathological Division of the United States Bureau of Animal Industry, according to a report by Schroeder;[13] in one of 40 fetuses studied by Traum;[14] and in two examined by Barger.[15] The limited literature on the occurrence of vibrionic abortion in cattle may be due to a low incidence of the disease or to difficulty in detecting the presence of the organism by available methods.

That *V. foetus* may account for a significant abortion rate, at least in some herds, is indicated by results reported by Smith,[4] who found that 23.8 per cent of 109 abortions in a herd in which brucellosis was present were caused by *V. foetus*. With the establishment of large numbers of brucellosis-free herds, the need for further information on abortions due to causes other than Bang's disease has become very apparent.

Heretofore, the detection of *V. foetus* infection has depended upon either direct microscopic examination of the stomach fluid of aborted fetuses for spiral-shaped organisms, or the culturing of fetal tissue and stomach fluid in deep gelatin serum agar, as was done by McFadyean and Stockman,[7] or by placing the inoculum in the condensation water of slants of fresh liver infusion agar or blood agar. These methods are of limited value in detecting *V. foetus* for the following reasons: (1) infection may be limited to the placenta and consequently missed by the examination of fetal organs; (2) cultural tests are of little use in the presence of other organisms; (3) a heavy inoculum is required to insure growth; and (4) cultural methods of examination cannot be used to detect the presence of the infection in animals which fail to abort. Furthermore, difficulties encountered in maintaining stock cultures and in obtaining sufficient growth for antigen production have retarded the development of serological tests.

The isolation by the senior author of a culture of *V. foetus* from a fetus examined in September, 1940, stimulated an investigation into the growth requirements of the organism, and the occurrence and significance of *V. foetus* agglutinins in the blood serum of cattle. The results are reported here.*

EXPERIMENTAL

Cultivation of V. foetus.—Six strains of *V. foetus* were isolated from fetuses aborted by cows in 4 different herds. In two instances, cultures were obtained from colonies which appeared on blood-agar plates inoculated with stomach fluid, and 4 cultures were obtained by inoculating soft liver-infusion agar with the suspected material. Attempts to maintain the organisms on blood agar, the surface of liver-infusion agar and in broths containing liver infusion, beef infusion, serum, ascitic fluid, amniotic fluid or cysteine failed. The first culture isolated was perpetuated in the condensation water of fresh, liver-infusion,

*An abstract of a preliminary report was published in the Journal of Bacteriology, 42, (Dec., 1941), pp. 816-817.

agar slants until a more suitable medium was devised.

The gelatinous consistency of the stomach contents of a bovine fetus suggested the possibility of the physical character of the medium being an important factor in developing growth. Consequently, agar in concentrations of from 0.1 to 0.5 per cent was added to liver-infusion broth. The mediums were tubed, sterilized in 8 cc. amounts in 5/8" x 6" test tubes. The soft agar tubes were then inoculated with cells from a culture grown in the condensation water of a liver-infusion, agar slant, and placed with CO_2. No growth was seen in the tubes that were incubated under ordinary atmospheric conditions, nor in those which were placed in the jar that contained 30 per cent CO_2. Growth was most abundant in the presence of 10 per cent CO_2.

An initial pH of 7.4 was found to be optimum for growth in the presence of added CO_2.

Nutritive Constituents of the Medium.—A study was made of the ability of commercial meat extract, liver infusion, beef infusion and peptone to support the growth and continued viability of *V. foetus*. All

TABLE 1.—Influence of Nutritive Constituents of Medium[1] on Growth and Viability

Extract	Peptone	Growth[2] after ___days					Viability[3] after ___days		
		1	2	3	5	7	15	30	60
none	Bacto	0	0	0	0	0	—	—	—
Bacto Beef Extract	None	0	0	0	0	0	—	—	—
	Bacto	0	+	+	++	++	0	0	0
Liver infusion	None	+	++	++++	++++	++++	+	+	±
	Bacto	+	+++	++++	++++	++++	+	+	±
Beef infusion	None	+	+++	+++	+++	+++	±	0	0
	Bacto	++	++++	++++	++++	++++	+	±	0

[1]All mediums contained 0.3 per cent agar.
[2]Amount of growth is represented as +, ++, +++, ++++.
[3]Viability: — = no test, 0 = not viable, + = viable and ± = variable results.

incubated in the presence of an atmosphere containing 10 per cent CO_2. Maximum growth took place in the medium containing 0.3 per cent agar. During incubation at 37 C for a period of twenty-four hours, growth appeared from 0.5 to 1.0 cm. below the surface in the form of a narrow band about 1 mm. in thickness. After from three to five days, a dense grey zone of cells from 2 to 4 mm. in width was observed just beneath the surface. The successful cultivation of *V. foetus* in the soft, liver-infusion agar made possible further observations on the growth requirements of the organism and the preparation of an agglutination antigen.

To determine the atmospheric conditions favorable to growth, a series of tubes containing soft, liver-infusion agar was inoculated and incubated under ordinary atmospheric conditions and in jars in which from 5 to 30 per cent of the air was replaced with CO_2. No growth was seen in the tubes that were incubated under ordinary atmospheric conditions, nor in those which were placed in the jar that contained 30 per cent CO_2. Growth was most abundant in the presence of 10 per cent CO_2.

An initial pH of 7.4 was found to be optimum for growth in the presence of added CO_2.

Nutritive Constituents of the Medium.—A study was made of the ability of commercial meat extract, liver infusion, beef infusion and peptone to support the growth and continued viability of *V. foetus*. All of the test mediums contained 0.3 per cent agar and were adjusted to an initial pH of 7.4. Cultures were incubated in the presence of 10 per cent CO_2. The results are given in table 1.

Neither Bacto beef extract (0.3%) nor Bacto-peptone alone contained substances capable of supporting *V. foetus*. A medium which contained both substances yielded only slight growth. Liver infusion with 0.3 per cent agar showed visible growth after twenty-four hours, which became abundant after three days. A similar medium to which 1 per cent peptone was added gave slightly better growth than one prepared with liver infusion alone. Beef infusion appeared to be as satisfactory as liver infusion for promoting the growth of *V. foetus*.

Liver infusion 0.3 per cent agar prepared with or without peptone was more suitable than the other mediums tried in maintain-

ing the viability of *V. foetus* cultures. Cultures grown in this medium under increased CO_2 tension at 37 C for a period of three days, and then stored at room temperature under ordinary atmospheric conditions, remained viable for a period of thirty days.

Ability to Utilize Carbohydrates.—A basic medium composed of beef infusion, 1.0 per cent peptone, 0.3 per cent agar and 1.0 per cent Andrade's indicator was prepared and adjusted to pH 7.4. The following test substances were then added to the basic medium in 1 per cent concentration: arabinose, dextrose, dextrin, dulcitol, galactose, inulin, lactose, levulose, maltose, mannitol, raffinose, salicin, sucrose, sorbitol and trehalose. The tubes were inoculated and examined after one, three and seven days incubation. Good growth was obtained in all of the tubes. However, no evidence of acid production was observed.

Pathogenicity for Chick Embryos.—Through the coöperation of Edwin L. Minard, five 12-day-old chick embryos were inoculated with cultures of *V. foetus.* Growth occurred in the allantoic fluid. All 5 embryos which received the inoculum died within a period of five days. This is of particular interest, since reports in the literature indicate that attempts to demonstrate pathogenicity of *V. foetus* for laboratory animals have been generally unsuccessful.

Agglutination Antigen.—After numerous unsuccessful attempts to grow cells for antigen on solid mediums and in agar-free broth, it was necessary to resort to the use of soft, liver-infusion agar. Fractional centrifugation was used to separate the bulk of the agar from the cells. The procedure adopted for antigen production is as follows:

The medium consists of

Liver infusion (1 lb. beef liver per liter)	1000 cc.
Bacto-peptone	10 Gm.
Bacto-agar	3 Gm.

The peptone is dissolved in the liver infusion and the medium adjusted to pH 7.4, heated in flowing steam for 15 minutes, cooled to below 20 C and filtered through coarse filter paper. The agar is then added and dissolved, and 8 cc. amounts placed in ordinary test tubes for stock cultures, and 10 cc. amounts in 1″ x 6″ tubes for antigen production. The medium should be used within ten days after preparation.

Stock cultures are transferred every two weeks. Incubation is for a period of three days in an atmosphere containing 10 per cent CO_2. The cultures are then stored under ordinary conditions at room temperature.

Cells for antigen are grown as follows: A three-day-old culture is used to inoculate 1 seed culture for each set of 10 tubes for antigen production. The seed cultures are incubated four days, the growth layer removed with a pipette and the bacterial cells suspended in an equal volume of nutrient broth. About 0.3 cc. of the resulting suspension is deposited in the upper third of the soft agar medium in each tube used for antigen production. The inoculated tubes are incubated at 37 C in the presence of 10 per cent CO_2 for a period of six days.

The cell-containing layer of antigen agar culture in each tube is mixed with 2 cc. of neutral formalinized (0.3% formalin) saline and removed with a pipette. The resulting suspension is further diluted with 3 volumes of the saline solution and centrifuged at 1,600 r.p.m. for thirty minutes. The cell-containing supernatant is removed, and the sedimented agar resuspended and centrifuged as before. The combined supernatants are placed in heavy-walled Pyrex tubes and centrifuged in the conical head of an International Centrifuge at 3,200 r.p.m. for a period of thirty minutes. The cells are then removed and suspended in a small volume of formalinized saline solution and stored in the refrigerator. This stock antigen is diluted for use in the tube agglutination test to a density of 1.5 on the McFarland nephelometer scale.

Demonstration of Vibrionic Abortion.—Evidence of abortion due to *V. foetus* has been found by the writers in 13 animals in 9 brucellosis-free herds. In 9 instances, the fetus and a blood sample from the aborting cow were examined, and in 4 instances a blood sample only was received.

Bacteriological findings on the aborted fetuses examined and the agglutinin titer of the serum of the aborting cows are summarized in table 2.

The stage of pregnancy in which vibrionic abortion occurred varied from two to seven months. Ten of the 13 animals aborted after the fourth and before the eighth month of pregnancy.

The agglutinin titers of 7 cows that aborted fetuses in which *V. foetus* was found varied from less than 1 : 25 to 1 : 800. The serum from the animal (H1) that aborted at two months failed to agglutinate either the stock antigen or an antigen prepared from the culture obtained from the fetus. It appears probable that infection and subsequent abortion occurred before

TABLE 2.—Bacteriological Findings and Agglutinin Titers in Vibrionic Abortion

			Fetus		Agglut. titer of blood of dam						
			Bacteriological Examination		Serum dilution						
					1/25	1/50	1/100	1/200	1/400	1/800	1/1600
Herd	Animal	Age in mo.	Microscopic	Cultural							
E	40	4	+	contaminated	+	+	+	+	+	+	i
H	1	2	+	+	0	0	0	0	0	0	0
K	149	6	0	+	+	+	+	+	i	0	0
	176	7	0	0	+	+	+	+	i	0	0
M	88	6	+	+	+	+	+	i	0	0	0
	89	6	+	+	+	+	+	i	0	0	0
	91	3	0	0	+	+	+	+	+	+	i
	95	5	0	+	+	+	+	+	+	i	0
N	679	6	+	+	+	+	+	+	+	+	i
C	120	5		not made	+	+	+	+	i	0	0
G.H.	R	6		not made	+	+	+	+	i	0	0
S1	1	6		not made	+	+	+	+	i	0	0
Si	62	7		not made	+	+	+	+	i	0	0

+ = complete, and i = incomplete or partialreaction.

Vibrios were detected by direct microscopic examination of the stomach fluid of 5 of the 9 fetuses examined. Gram-stained films and liquid mounts were used.

Cultures of *V. foetus* were obtained from the stomach fluid of 6 of the 9 fetuses. Five fetuses yielded growth in soft, liver-infusion agar and 1 (examined before the special medium was used) gave colonies on blood agar. The stomach fluid from 3 fetuses produced colonies of *V. foetus* on solid blood agar. However, the cultures could not be maintained on this medium. In one instance (E40) the direct microscopic test was positive, but no *V. foetus* colonies were obtained on blood agar, and the soft agar medium was rendered useless by contaminating organisms. The fetuses from animals K149 and M95 were negative by direct microscopic examination, and positive by the new cultural tests.

measurable amounts of agglutinins were formed. Of the 6 remaining animals, 2 yielded serum having a titer of 1 : 100, one a titer of 1 : 200, one of 1 : 400, and two of 1 : 800. Two animals (K176 and M91) aborted fetuses in which *V. foetus* was not found, but their serums gave agglutinin titers of 1 : 200 and 1 : 800, respectively. It seems probable that in these two instances infection was limited to the placenta. As shown by Smith,[1] vibrionic abortion results primarily from a placentitis, and infection of the fetal tissue is secondary to infection of the placenta. Blood samples only were received from 4 aborting animals in 4 additional herds. All 4 gave an agglutinin titer of 1 : 200 with *V. foetus* antigen.

The results presented here show that laboratory examination for vibrionic abortion should include direct microscopic and

cultural tests on the aborted fetus, and serological tests on the blood serum of the aborting cow.

Agglutinin Titers in 12 Herds.—Blood samples were drawn from animals over 6 months of age in 12 brucellosis-free herds and examined for *V. foetus* agglutinins. In 6 herds, evidence of *V. foetus* infection had been found within thirty days of the time of the test. The other 6 herds, regarded as free from *V. foetus*, had been under close observation during the year preceding the test. Four animals in these herds aborted during this period. The fetuses and blood samples from the aborting cows were examined and found negative for *V. foetus*. The aggutinin titers obtained on blood serum from animals in the 12 herds are summarized in table 3.

TABLE 3.—Agglutinin Titers in Infected and Non-Infected Herds

Herds	Number of animals	Number of animals with titer* of: 0 to 1 — 25	1 — 50	1 — 100	1 — 200	1 — 400	1 — 800
6 infected	237	193 (81.5%)	17 (7.2%)	12 (5.0%)	8 (3.4%)	4 (1.7%)	3 (1.2%)
6 not infected	322	290 (90.0%)	26 (8.1%)	6 (1.9%)	0	0	0

*Titer is based on the highest serum dilution in which 75 to 100 per cent of the cells were agglutinated.

Titers of from 1 : 200 to 1 : 800 were given by 6.3 per cent of the samples from 237 animals in the infected herds. The incidence for individual herds varied from 3.2 to 15 per cent. In comparison, none of the samples from 322 animals in the "*V. foetus*-free" herds caused complete agglutination at the 1 : 200 level. Titers of 1 : 100 were observed in both sets of samples; however, the incidence for samples from the infected herds was 5 per cent as compared with an incidence of 1.9 per cent for the apparently noninfected herds. Agglutination in the 1 : 25 and 1 : 50 dilutions was fairly common in both sets of samples.

Interpretation of Agglutination Reactions.—The results presented in tables 2 and 3 suggest that serums which give a maximum agglutinin titer of 1 : 50 or less should be classed as *negative;* those which cause complete agglutination in the 1 : 100 dilution and partial in the 1 : 200 dilution should be recorded as *suspicious;* and those which give complete agglutination in dilutions of 1 : 200 or higher should be classed as *positive.* In routine tests, the serum dilutions employed may, it would seem, be limited to 1 : 50, 1 : 100, and 1 : 200.

Age and Positive Reactions.—The incidence of positive reactions given by animals of different ages in 6 infected herds was determined; that of positive reactors among 98 animals under 2 years of age was 1 per cent, while among 270 animals over 2 years of age it was 8.5 per cent. No significant differences were observed between different age groups of adult animals.

Course of Infection in 2 Herds.—The course of *V. foetus* infection in herds M and K, as indicated by periodic agglutination tests, was observed over a period of eighteen months.

In herd M (average of 20 head), a slow progressive spread of infection occurred during the interval between Nov. 14, 1940, and Apr. 23, 1941. At the same time, animals positive on one test were usually negative on subsequent tests. Consequently, although 5 animals reacted positively and 1 suspiciously during the first five months of observation, the incidence was low for any given test (5 to 10%). During the following year, the incidence of infection rose to 21.7 per cent, due to apparent reinfection as well as new infection. The herd was dispersed in the spring of 1942.

In herd K (average of 43 head), the incidence of positive and suspicious reactors

was 25 per cent on the first test, which was made on March 31, 1941. Of the 10 animals involved, 2 were sold and 8 became negative by the time of the second test, which was made on Apr. 27, 1941. Three newly positive reactors accounted for an incidence of 6.8 per cent in the April test. One remained positive until the end of the period of observation, 1 was sold and 1 became negative. One new reactor and 1 which was positive at the time of the previous test brought the incidence to 5 per cent on Feb. 9, 1942. Two months later (5/20/42) the proportion of animals which gave positive or suspicious reactions had increased to 12.8 per cent, and on Aug. 20, 1942, to 25.6 per cent.

Duration of Positive and Suspicious Reactions.—The results of repeated tests on animals in herds M and K showed that agglutinin titers of 1 : 100 or higher were of short duration. Of 24 animals giving positive or suspicious reactions, 18 or 75 per cent were classed as negative when tested from three to six months later. In many instances, such animals gave serum on the second test which was completely negative in all of the test dilutions.

TABLE 4.—Relation of Positive Reactions to Abortion

Number of animals	Agglutination reaction: When open	Agglutination reaction: Months after conception: 1 to 4	Agglutination reaction: Months after conception: 5 to 9	Calving record: Aborted	Calving record: Normal
8	0	0	+	5	3
11*	±	±	0	1	10
3	+	0	+	0	3

*Positive when open or during first 4 months of gestation, and negative during last 5 months.

Proportions of abortions in the 8 animals which were positive during the last five months of pregnancy and the 11 animals which were negative during the last five months of pregnancy show a significant difference. (Using Yate's adjustment for small numbers, $X^2 = 3.864$, $n = 1$ and $P = 0.049$).

Positive Agglutination Reactions and Abortion.—The observation that 75 per cent of positive-reacting animals became negative in less than three months suggested that the stage in the breeding cycle in which the reaction occurs may be related to subsequent abortion. In herds M and K, 22 cows reacted positively while open or at some time during pregnancy. The agglutination reactions of these animals at different stages of the breeding cycle in which a positive reaction occurred were compared with their subsequent calving record. The results are given in table 4.

Of 8 animals which gave their first positive reaction during the last five months of pregnancy, 5 aborted. Of 11 animals which were positive while open or during the first four months of pregnancy and then changed to negative before the fifth month of gestation, 10 calved normally. The single animal in this group that aborted did so at three months, and subsequently changed to negative.

Three animals were positive while open, negative during the first four months after conception, and positive again during the last five months of pregnancy. All three calved normally. However, during the preceding pregnancy 2 of the 3 aborted. While the number is too small to justify conclusions, these results suggest the possibility that initial infection and recovery may be followed by an increased resistance toward subsequent infection.

It is of interest to compare the abortion rate with the number of positive reactors in herds M and K. In herd M (20 cows), the annual abortion rate due to *V. foetus* was 20 per cent. A total of 8 animals reacted positively and 4 aborted, 1 at three months. Six of the 8 animals were negative during the first four months of pregnancy and positive during the last five months; 3 of the 6 aborted. In herd K (43 cows), the annual abortion rate was only 4.7 per cent, although a total of 14 animals reacted positively. Four, 2 of which aborted, were negative before and positive after the fifth month of gestation. Nine animals were positive during the first four months and negative during the last five months of gestation, and one other animal was positive while open, changed to negative and then back to positive during the last five months. These 10 animals calved normally.

The results indicate that a relatively high incidence of positive reactors to the agglu-

tination test for *V. foetus* infection may or may not be accompanied by a high abortion rate, depending upon the stage of gestation of animals at the time of the positive reaction, and whether or not the positive-reacting animals have been infected previously.

SUMMARY AND CONCLUSION

Conditions favorable for growth of 6 freshly isolated strains of *Vibrio foetus* of bovine origin were supplied by a soft agar medium consisting of liver infusion, 1 per cent peptone, and 0.3 per cent agar, and adjusted to pH 7.4; and by an atmosphere consisting of 10 per cent CO_2 and 90 per cent air. Initial growth appeared in a restricted zone from 0.5 to 1.0 cm. beneath the surface, and then extended upward to produce a grey zone of cells about 4 mm. in depth. The soft, liver-infusion agar was used in growing cells for antigen production.

Findings on 9 aborted fetuses and blood samples from the aborting cows showed that *V. foetus* infection was detected in 5 by direct microscopic examination of stomach fluid, in 6 by cultural methods, and in 8 by the agglutination test. All three procedures should be employed in diagnosing abortions caused by *V. foetus*.

Agglutinin titers of the blood serum of 7 cows which aborted *V. foetus*-infected fetuses were as follows: one less than 1 : 25, two 1 : 100, one 1 : 200, one 1 : 400, and two 1 : 800. Of 237 animals in 6 infected herds, 6.3 per cent gave serum having a titer of 1 : 200 or higher. None of the samples from 322 animals in 6 "*V. foetus*-free" herds gave complete agglutination at the 1 : 200 level. It appears that an agglutinin titer of 1 : 50 or less should be classed as *negative*, 1 : 100 as *suspicious*, and 1 : 200 or higher as *positive*.

Periodic agglutination tests were made on animals in 2 infected herds over a period of eighteen months. Of 24 positive animals, 18 or 75 per cent became negative in less than three months. Five of 8 cows which were negative before and positive after the fifth month of gestation aborted. On the other hand, 10 cows which were positive before and negative after the fifth month of gestation calved normally. Of 3 cows which were positive during the last five months of each of 2 pregnancies, 2 aborted in the first pregnancy and all 3 calved normally, following the second pregnancy.

It is concluded that the agglutination test is of value in diagnosing abortions due to *V. foetus* and in determining the probable presence of *V. foetus* infection in a herd of cattle; that abortions due to *V. foetus* usually occur during the fifth, sixth and seventh months of pregnancy; and that *V. foetus* infection in cattle tends to be self-limiting, because of the transitory nature of infection and a tendency for initial infection to increase resistance to subsequent exposure.

References

[1]Smith, Theo.: Spirilla Associated with Disease of the Fetal Membranes in Cattle (Infectious Abortion). J. Exptl. Med., *28*, (1918), pp. 701-719.

[2]Smith, Theo., and Taylor, M. S.: Some Morphological and Biological Characters of the Spirilla *(Vibrio fetus*, N. Sp.) Associated with Disease of the Fetal Membranes in Cattle. J. Exptl. Med., *30*, (1919), pp. 299-312.

[3]Smith, Theo., The Etiological Relation of Spirilla *(Vibrio fetus)* to Bovine Abortion. J. Exptl. Med., *30* (1919), pp. 313-323.

[4]Smith, Theo.: The Bacteriology of Bovine Abortion, with Special Reference to Acquired Immunity. J. Exptl. Med., *30*, (1919), pp. 325-339.

[5]Smith, Theo., Little, R. B., and Taylor, M. S.: Further Studies on the Etiological Rôle of *Vibrio foetus*. J. Exptl. Med., *32*, (1920), pp. 683-689.

[6]Smith, Theo.: Further Studies on the Etiological Significance of *Vibrio foetus*. J. Exptl. Med., *37*, (1923), pp. 341-356.

[7]McFadyean, F., and Stockman, S.: Report of the Departmental Committee Appointed by the Board of Agriculture and Fisheries to Inquire into Epizoötic Abortion. 1913. London.

[8]Carpenter, C. M.: Researches upon a Spirillum Associated with Abortion in Ewes. Report N. Y. State Vet. College for the year 1918-1919, (1920), pp. 129-157.

[9]Baker, D. W., and Stone, W. S.: A Study of *Spirillum ovis* Infection in a Group of Ewes Maintained Under Observation for Two Successive Lambing Seasons. Cornell Vet., *29*, (1939), pp. 32-34.

[10]Welsh, H., and Marsh, H.: Vibrionic Abortion in Sheep. J. Am. Vet. Med. Assoc., *65*, (1924), pp. 203-210.

[11]Graham, R. and Thorp, F.: Vibrionic Abortion in Sheep. J. Am. Vet. Med. Assoc., *76* (1930), pp. 568-573.

[12]Ryff, J. F.: Vibrionic Abortion in Michigan Sheep. J. Am. Vet. Med. Assoc., *97*, (1940), pp. 452-453.

[13]Schroeder, E. C.: Review of Several Publications on Infectious Abortion Disease. J. Am. Vet. Med. Assoc., *57*, (1920), pp. 270-281.

[14]Traum, J.: The Importance of *Bacterium abortum* of Bang and Other Microörganisms in Bovine Infectious Abortion. Calif. Agr. Expt. Sta. Bull. 353 (1923).

[15]Barger, E. H.: Report of a Case of Abortion Induced by *Vibrio foetus*. J. Am. Vet. Med. Assoc., *72*, (1928), pp. 468-474.

Nutritional Deficiencies in Poultry

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CHICKENS HAVE BEEN extensively used as experimental animals in nutritional studies. Other genera, including pigeons, turkeys and pheasants, have also been used. A large amount of information concerning the symptoms of nutritional deficiencies in poultry has been accumulated from these studies. This information has been of great value in the field diagnosis of dietary diseases of poultry.

Insufficient supplies of essential vitamins, minerals or amino acids may all result in deficiency diseases in poultry. Eleven specific avitaminoses have been described in chickens. Vitamin A deficiency was first recognized in 1923. The symptoms of vitamin A deficiency have been described (Beach and Freeborn, 1936) as ". . . decrease in appetite, weakness and emaciation, droopiness, reddened and watery eyes which may be followed by the formation of an adherent white film over the third eyelid and a mass of white cheesy material within the eyelids; the formation of yellowish white, round cheesy pustule-like patches in the mouth and throat, of about the size of a pinhead; and occasionally the formation of masses of white cheesy material in the cleft or elsewhere in the mouth. Postmortem examination of birds that have died usually shows the kidneys to be very pale and marked with a network of very fine white lines. Occasionally, a deposit of white material is also found on the surface of the liver, on the membrane around the heart, or elsewhere on the surface of the organs." Similar symptoms are observed in turkeys, except that the kidneys do not appear to be clogged with urates as in chicks.

The effects of a deficiency of vitamin D in chickens are so profound that the poultry industry was revolutionized by the discovery of this vitamin, its sources, and its effects. The deficiency in young birds leads to rickets, marked by slow growth, lameness, swelling of the joints, and bone deformities. The ash content of the bones is abnormally low. In laying birds, a deficiency of vitamin D leads to a lowering of egg production and a marked decrease in hatchability, accompanied by a loss of minerals from the skeleton. Young turkeys are especially susceptible to a deficiency of vitamin D. Deformities of the breastbone in poultry often indicate that vitamin D deficiency has occurred at some period during the bird's life.

The symptoms of vitamin E deficiency have been studied experimentally in poultry and a number of pathological symptoms have been described (Pappenheimer, Goettsch and Jungherr, 1939). In young chickens, these include ataxia, coarse tremors, opisthotonos, forced and spasmodic movements and increasing incoördination ending in prostration and death. Upon autopsy, lesions are found in the brain, especially in the cerebellum, where edema, necrosis and hemorrhages have been found. The syndrome is termed *nutritional encephalomalacia*. An exudative diathesis, marked by accumulations of blood plasma under the skin, originating from inflamed and hyperemic capillaries in the connective tissue, has also been ascribed to vitamin E deficiency.

Attention has been drawn to the similarity of the symptoms of experimental nutritional encephalomalacia and those of "crazy chick disease."

A nutritional myopathy of the gizzard in young turkeys and a generalized myasthenia of ducklings have been noted under experimental conditions which indicated a deficiency of vitamin E.

It is difficult to obtain indications of vitamin E deficiency on diets of practical foodstuffs. All indications are that vitamin E deficiency is rare under field conditions, and

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that adult birds are resistant to its onset.

Vitamin K deficiency in poultry is essentially a condition confined to the experimental laboratory, for the inclusion of as little as 0.5 per cent of alfalfa meal in the diet will prevent the deficiency completely. The presence of vitamin K is essential to the formation of prothrombin. No other action of the vitamin is known. In vitamin K deficiency, the diminished prothrombin of the blood results in an increased blood-clotting time. Birds with vitamin K deficiency are subject to dietary hemophilia. They often bleed to death internally when a small blood vessel is ruptured under conditions which in a normal animal would lead to the immediate sealing of the lesion by formation of a small clot. It is of interest that the discovery, isolation, and synthesis of vitamin K was made by experiments solely with chicks but has been of benefit in human medicine rather than to the poultry industry.

Likewise in the case of thiamin, the discovery of a vitamin was made by experiments with chicks and later applied primarily to human nutrition. Thiamin deficiency in chickens results in the following train of symptoms: loss of appetite, loss of weight, paralytic symptoms characterized by opisthotonos, complete paralysis and death. The syndrome is termed *polyneuritis*. As practical chick rations supply ample quantities of thiamin, the deficiency is not ordinarily encountered in the field.

Riboflavin is of great importance in poultry nutrition both for adult and growing birds. In young chickens, riboflavin deficiency results in slow growth and a peculiar paralysis of the legs characterized by flexion of the toes and hock joint with medial rotation (curled-toe paralysis). Neuropathological symptoms have been described in chicks by Phillips and Engel (1938). Hypertrophy was observed in the main peripheral nerve trunks, accompanied by degeneration of myelin, prolification of the Schwann cells, and swelling and fragmentation of the axis cylinders. The deficiency in laying hens caused decreased egg production and a decrease of hatchability marked by abnormalities of the embryo. These abnormalities include edema, degeneration of the Wolffian bodies, "clubbed down" and dwarf-type embryos (Lepkovsky, Taylor, Jukes and Almquist, 1938). In young turkeys, dermatitis rather than curled-toe paralysis develops as a result of riboflavin deficiency. Symptoms of riboflavin deficiency are likely to occur in farm flocks unless a satisfactory ration is fed. Cereal grains are deficient in riboflavin.

Pantothenic acid deficiency in chicks results in slow growth, ragged and brittle feathers, encrustations at the corners of the mouth, and stuck eyelids. The mortality is high. A decrease in hatchability results when laying hens are fed a diet containing insufficient pantothenic acid. The deficiency in young turkeys causes high mortality, usually without the appearance of dermatitis.

Experimental studies have led to discovery of the symptoms of pyridoxine deficiency in chicks. The chicks grow slowly, and frequently they show spasmodic convulsions with coarse tremors. The mortality is high.

A deformity known as perosis, slipped tendon or hock disease is often encountered in the field, particularly in young chickens that are confined on wire floors. Perosis starts with a swollen appearance of one or both hock joints, although the bird appears normal in every other way. As the condition progresses, the joint is distorted either laterally or medially, and the tendo-Achilles becomes displaced or "slipped" from the groove between the condyles of the tarsus. A permanent dislocation results. Perosis may be produced by a variety of causes, including deficiencies of the vitamins choline or biotin, or manganese. Choline deficiency also results in slow growth. In adult birds, a deficiency of choline has been reported to decrease egg production, increase mortality, and cause the abortion of egg yolks.

When chicks are fed an experimental diet containing uncooked egg white, biotin deficiency develops. The deficiency may also be developed on purified or heated diets. The symptoms include slow growth, ragged

feathers, dermatitis beneath the mandible and on the toes, stuck eyelids, and perosis. Similar symptoms occur in young turkeys.

Erosions or necrosis of the secreted lining of the gizzard are frequently observed in young chicks both under field conditions and in the laboratory. The lesions are prevented by feeding bile or bile acids. A dietary factor present in green leaves or liquid milk also prevents the condition, but vitamin K is ineffective (Almquist, Mecchi and Kratzer, 1941). The lesions may also involve the epithelium of the gizzard.

Other deficiencies, including slow growth and anemia, have been frequently observed in chicks on purified diets, and are due to deficiencies of unknown factors of a vitamin-like nature. Experimental studies have demonstrated the ability of chicks to synthesize vitamin C and nicotinic acid. It is presumed that deficiencies of these substances cannot be produced in chicks.

Poultry are quite susceptible to deficiencies of certain minerals. Inadequate amounts of calcium and phosphorus tend to produce poor calcification, especially if the supply of vitamin D borders upon insufficiency. A deficiency of calcium results in low egg production and imperfect egg shells. Excessive amounts, on the other hand, interfere with the absorption of manganese, and may produce the symptoms of a deficiency of this element. These symptoms include slow growth, perosis, micromelia, reduced ash content of egg shells, ataxia, low hatchability and deformed embryos (Wilgus, Norris and Heuser, 1939).

Sodium chloride deficiency produces slow growth in chicks, and a tendency toward cannibalism has been reported under certain conditions. Chicks have a rather high requirement for potassium and a lack of this element has been shown in experimental studies to cause slow growth and high mortality. Iodine deficiency in chickens has recently been produced experimentally (Wilgus, 1942). It results in enlarged thyroid glands, a failure to maintain adult body weight and a tendency toward lower hatchability. Practical rations usually contain sufficient iodine. Experimental studies have recently shown that magnesium deficiency causes slow growth in chicks, accompanied by convulsive symptoms. Iron and copper deficiencies produce anemia in chicks, but practical rations contain ample supplies of these elements. Their addition to the diet is unnecessary; in fact, iron salts may produce perosis.

Chicks have a high requirement for certain amino acids, and a deficiency of protein hence leads to slow growth. Deficiencies of glycine and arginine cause frayed feathering and muscular weakness, the latter probably from creatine deficiency. A shortage of methionine causes frayed feathering. Glycine, arginine, methionine, histidine, tryptophane, and lysine are all essential to growth. The cystine requirement is small if ample quantities of methionine are fed. Deficiencies of other amino acids have not been investigated.

In farm flocks, deficiencies have been reported of vitamins A, D and E, riboflavin, biotin, the gizzard factor, calcium, manganese, sodium chloride, iodine and protein.

Shortage of Veterinarians Widely Recognized

There is no lack of opinions on the shortage of veterinarians in the United States and its evil potentiality. After a survey in Illinois the state association expresses regrets in a circular addressed to the members of the profession that incompetent veterinary service threatens to replace the kind of service veterinarians have preconized for this country. The situation in Iowa was told by President H. E. Tyner in his address before the recent meeting of the Eastern Iowa association in Cedar Rapids. We quote;

> Our ranks are filled with men past middle age. There seems to be a dearth of young men in the veterinary service. As an act of defense for the future, there should be a supreme effort made to graduate more young men than have been graduated in recent years. We must be alert and ready to curb the ravages of animal diseases. That duty we owe to the nation.

These pronouncements from practitioners in the field have considerable meaning. The fear of new competition has given way to altruistic devotion to their calling.

Publication Rules of the AVMA

Orthography

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THE JOURNAL aims to follow the spelling of *Webster's New International Dictionary* for the general language, and *Stedman's Medical Dictionary* for the language of medicine but holds no grudge against the disciples of other authorities. Uniformity, however, is advised. If it's "thiamin," here, it should not be "thiamine" there—an example of lopping or retaining the terminal *e*, in medical writing. Of course, misspelling of common words is always frowned upon. It detracts from one's confidence in the writer and distracts from the value of what is written, regardless of its technical excellence. Carelessness is the main cause of poor spelling, although there is no doubt that the knack of spelling well is an inborn gift not universally possessed. The writer who never puts *ible* where *able* should be is a master speller—a throwback from the spelling-down contests of the little red school house, which modern education never excelled in the making of good spellers. Manuscript reading wakens that thought. Words of the general language commonly misspelled are catalogued below. Believe it or not, the list is that of misspelled words gathered as a hobby through years of abstracting, book reviewing, and editing manuscripts for publication. Not a word contained in the long list has any other source than the veterinary literature of this period. Horrible example? No, the examples are strewn over so many periodicals, books and manuscripts that they rest serenely unnoticed by those who read as they run. As the list grew longer and longer right up to this New Year, it became one of the inspirations to go on with this series of articles of veterinary medical writing. Meanwhile, be not deceived, this author's corrigendum helped materially to swell the catalogue of misspelled words which are herein printed for the first time.

The publication of the long list is purposeful. Note that the list is one of common words of the average veterinarian's vocabulary. Were the unusual polysyllables of the show-off type and the medical terms included, the list alone would fill quite a large booklet. These may be published in a coming issue. This list of common, everyday words is useful as a silent lesson in spelling and more particularly to prove that English orthography is, indeed, *difficult*. Even the reason why it is *difficult* is *difficult* to explain without a broad knowledge of the root words in the basic language whence they were derived. Why drop the *e* in *sizable* and retain it in *peaceable*, and many, many other orthographic variations, some based upon set rules and some on habit, is the subject for a thesis too lengthy for this series and far beyond the ken of its author. Like the scholars of the old, country schools who learned to spell well by practice, so must the writing veterinarian learn to spell in the hard, unscientific way—by the eyesight as a glance at the ugliness of the "incorrect" column reveals:

Incorrect	*Correct*
alkiline (n)	alkaline
annorexia	anorexia
audable	audible
abbatoir	abattoir
abandonned	abandoned
abridgement	abridgment
abcess	abscess
acceptence	acceptance
acclamatise	acclimatize
accountible	accountable
acetyline	acetylene
achievible	achievable
acknowledgement	acknowledgment
administeration	administration
advertisment	advertisement
agreable	agreeable
albumenous	albuminous
antidate	antedate
appartment	apartment
acqueous	aqueous
avitamosis	avitaminosis
banful	baneful
beautefy	beautify
bereavment	bereavement
biennial	biennial
blizard	blizzard
bleech	bleach
bolchivik	bolshevik
bookeeper	bookkeeper
breach	breech (gun)
bungilow	bungalow
cadance	cadence

Incorrect	*Correct*
cancelled	canceled
cartalage	cartilage
cemetary	cemetery
changable	changeable
charlitan	charlatan
chloriform	chloroform
circumfrence	circumference
colateral	collateral
colyrium	collyrium
consistance	consistence
corderoy	corduroy
counsel	council (group)
council	counsel (advice)
covey	covy (brood)
credable	credible
creditible	creditable
curitive	curative
Dachund	Dachshund
definate	definite
dependant	dependent
derilict	derelict
detergant	detergent
dietician	dietitian
dimention	dimension
diphtheratic	diphtheritic
disbursment	disbursement
dispensible	dispensable
dispensory	dispensary
dispensatary	dispensatory
distiled	distilled
distrustted	distrusted
divy	divvy
doner	donor
dysentary	dysentery
edable	edible
elegence	elegance
eminate	emanate
endorsment	endorsement
entrustted	entrusted
execerbation	exacerbation
existance	existence
extranious	extraneous
exageration	exaggeration
extravisate	extravasate
fabracate	fabricate
fallicy	fallacy
fallable	fallible
farinacious	farinaceous
fastideous	fastidious
figity	fidgety
fense	fence
firey	fiery
filiment	filament
Jileing	filing (rasping)*
filing	filling (dental)*
filled	filed (rasped)*
filed	filled (dental)*
flair	flare (flash)
flare	flair (emit)
forcast	forecast
forelorn	forlorn
foundary	foundry
fraternise	fraternize
fulmanate	fulminate
gelanical	galenical
gally	galley
gambel	gambol (romp)
glutonous	glutinous
goitre*	goiter
gorila	gorilla
grammer	grammar
gregareous	gregarious
halucination	hallucination
hapenned	happened
hapenning	happening
hazzard	hazard
heredatary	hereditary
homolagous	homologous

Incorrect	*Correct*
imbeded	imbedded
inapetence	inappetence
incontrovertable	incontrovertible
implantted	implanted
incompatable	incompatible
incorrigable	incorrigible
indiginous	indigenous
inocuous	innocuous
innoculate	inoculate
inuendo	innuendo
inovation	innovation
insiduous	insidious
interchangable	interchangeable
intractible	intractable
innure	inure
involvment	involvement
irreducable	irreducible
irrefutible	irrefutable
issueing	issuing
jaged	jagged
judgement	judgment
juxtiposition	juxtaposition
kennell	kennel
laboreous	laborious
labour*	labor
lardacious	lardaceous
laudinum	laudanum
laterly	laterally
laughible	laughable
leesh	leash (hold)
legicy	legacy
lessen	lesson (study)
licence*	license
lilly	lily
litegation	litigation
lumenous	luminous
luner	lunar
luxureous	luxurious
maserate	macerate
mallable	malleable
mandable	mandible
manuel	manual
maxamum	maximum
mezanine	mezzanine (floor)
millenium	millennium
millinary	millinery
moler	molar
molicule	molecule
moribound	moribund
moter	motor
mouthfull	mouthful
mummefy	mummify
mushroon	mushroom
mystefy	mystify
nacent	nascent
nebulus	nebulous
necter	nectar
notible	notable
obtainible	obtainable
occurrance	occurrence
odour*	odor
oleomargerine	oleomargarine
omnivorus	omnivorous
ordinance	ordnance (mil.)
ossious	osseous
paridoxical	paradoxical
pastorial	pastoral
perceivible	perceivable
perceptable	perceptible
perishible	perishable
perseverence	perseverance
pitious	piteous
portible	portable
practioner	practitioner
precareous	precarious
presice	precise
pregnent	pregnant
propituous	propitious
prerogitive	prerogative
presumptious	presumptuous
pretentuous	pretentious
principle	principal (main)

*These are commonly misspelled words *e.g.:* The veterinarian was *filing* (or *filed*) the teeth, the dentist was *filling* (or *filled*) them.

Incorrect	*Correct*
prominade	promenade
protean	protein (phys.)
pultacious	pultaceous
putrify	putrefy
rabbet	rabbit
rarification	rarefication
recepticle	receptacle
redundence	redundance
refinment	refinement
reinforcment	reinforcement
renumerative	remunerative
repugnence	repugnance
resistence*	resistance
responsable	responsible
restrainible	restrainable
resultent	resultant
revocible	revocable
rightious	righteous
safty	safety
salible	salable (also saleable)
scrimage	scrimmage
scirrulous	scurrilous
seasonible	seasonable
sedantery	sedentary
seriel	serial
severly	severely
shagy	shaggy
shaply	shapely
shean	sheen (bright)
simering	simmering
sinipism	sinapism
simultanious	simultaneous
sizeable	sizable
sleevless	sleeveless
soler	solar
solidity	solidarity (union)
spareing	sparing (scarce)
sparing	sparring (fight)
stiring	stirring (events)
stopage	stoppage
suderific	sudorific
suitible	suitable
swiming	swimming
symetric	symmetric
tangant	tangent
tarter	tartar
tassle	tassel
temperment	temperament
terrestral	terrestrial
theatre*	theater
torrant	torrent
trapings	trappings (harness)
traveled	travelled
tremendious	tremendous
trenchent	trenchant
trumviate	triumvirate
troter	trotter (horse)
truely	truly
tumour*	tumor
termoil	turmoil
typefy	typify
unbearible	unbearable
undefinible	undefinable
uninhabitible	uninhabitable
valorum	valorem
vestebule	vestibule
vitamine*	vitamin
wierd	weird
weild	wield
whirl*	whorl (hair)
willful*	wilful
wining	winning

CONCLUSIONS

Among the conclusions to draw in the reformation of our bad spelling, one is outstanding, and that is, *keep the dictionary at the elbow when writing.* We have no rules of thumb to recommend. Such rules as "*i* before *e* except after *c*" are beautiful rhymes until one hits such words as *weird* and *wield* and other exceptions *ad infinitum.* Or, get down to the business of telling why a man is *responsible* and a law *revocable.* There are reasons, of course, but those reasons are not likely ever to lie in the ken of the average veterinary writer. Ability to spell well, today as always, will remain a matter of experience. It's a visual achievement, not a science, a matter of knowing the tricky words one uses and checking with the lexicographers. Bad spelling is not our greatest sin.

*Word spelled both ways. The spelling in the "correct" column is the one adopted by the AVMA.

Diseases of Turkeys

As the turkey industry expands [as it has been doing in the last decade], there is greater and greater need for the services of veterinarians to aid the producers. The tremendous gains were made possible through research since 1928, when pollorum disease was found to affect turkeys. The same pattern for control in chickens applies in turkeys.

Paratyphoid, fowl pox, blackhead, crop mycosis, hexamitiasis and swine-erysipelas infections are all diseases requiring the attention of the practitioners.

Swine-erysipelas (*Erysipelothrix rhusiopathiae*) infection occurs in turkeys independent of any contact with swine, and there is yet no successful means of control. Antiserum has no value.

Hexamitiasis, which is caused by a unicellular parasite of the genus Hexamita, is a serointestinal enteritis of young poults. The parasite teems in the intestinal contents. Prevention consists of keeping poults away from adult turkeys which have been found to be "healthy carriers." The other diseases mentioned above are open to well-known methods of diagnosis and preventive treatment.

SEND ALL THE BOOKS YOU CAN SPARE TO THE 1943 VICTORY BOOK CAMPAIGN.

Tissue Vaccine in the Control of Mink Distemper

O. J. HUMMON, D.V.M. AND FRANCIS R. BUSHNELL
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IN A SEARCH for more approved methods of controlling and preventing distemper affecting ranch minks it is deemed advisable to test the advantages of tissue vaccine. Such a vaccine produced in laboratories from the lungs, livers, and spleens of distemper-infected minks has been used on experimental animals, as well as under practical ranch conditions, with definite promise of controlling the malady. Some variations in its effectiveness have been encountered on actual field trials, although if properly made and administered its value was evident. Healthy minks fed on a well-balanced ration are not immune, as many think, unless they have previously recovered from the disease. Based on previous observations, however, it must be pointed out that when poorly fed and under-nourished minks become infected with distemper virus the losses are usually greater.

Work carried out with distemper virus originating in a herd of minks to determine the effectiveness of tissue vaccine upon the remainder of the animals in this group is also reviewed in this article. A coöperative arrangement between the laboratory and the owner differs considerably from limited experimental work. The reliability of the owner and his willingness to fully coöperate in all details are paramount in supplying the information needed to arrive at constructive conclusions. This fact alone has prevented numerous field experiments from playing an important part in our studies of distemper in fur-bearing animals. The importance of such field experiments are: (1) that hundreds of animals are observed instead of only the few available under laboratory conditions, and thus, more accurate conclusions can be reached; (2) the field experimentation with fur animals is conducted under ranch conditions of feeding and housing with animals subjected to the usual climatic changes of the year. Considering these facts and the helpful coöperation of the owner, it is believed that the presentation of the following may be of economic value to mink ranchers who may have distemper outbreaks.

From Fish and Wildlife Service, Department of the Interior. O. J. Hummon, veterinarian and Francis H. Bushnell, bacteriologist.

METHODS OF PROCEDURE

Upon receiving distemper-infected minks at the laboratory early in June, it was learned from the owner that approximately 40 kits and 5 adults had been lost during the previous month. This caused considerable alarm to the owner during the kit season. The ranch complement consisted of 170 adults and 500 kits.

Formalized tissue vaccine was made and used at various times during June in vaccinating the remaining minks. It was prepared according to the method described by Pinkerton[1,2] with the exception that after 0.3 per cent of full strength (40%) formaldehyde solution was added, the 10 per cent suspension of tissue in physiological salt solution was stored in the refrigerator for seven days. From previous observations it was considered that formalized suspensions stored for four days, as described by Pinkerton,[2] was not sufficient time for the formalin to inactivate the virus.

This tissue vaccine injected subcutaneously into the groin, 1½ to 2 cc. to each animal, depending upon the size, was given at intervals of 7 to 10 days. In order to obtain satisfactory information on events as they occurred, we received frequent reports on the apparent effectiveness of the treatment. Specimens were brought to the laboratory for autopsy. Due to unavoidable circumstances, the vaccinations at approximately the same time was not accomplished as vaccine could not be produced in sufficient quantity. This resulted in a lag in the effectiveness as can be noted on the accompanying graph between the third week of June and the third week of July. The initial vaccine was used on 264 kits only, as represented by "A" on the graph. All kits received their first vaccination between June 10

[1]Pinkerton, Henry.—"Epidemiological Problems in Mink Distemper." The American National Fur and Market Journal, xvii (Oct. 1938), p. 5.

[2]Pinkerton, Henry.—"Immunological and Histological Studies on Mink Distemper," J.A.V.M.A., xcvi (Mar. 1940), pp. 347-355.

and June 28. Sufficient quantities of vaccine became available and the completion of the first, and in some cases, the second vaccination was accomplished during the time identified on the graph as "A 1." The completion of the second vaccination is represented on the graph as "B." Unfortunately, as previously stated, the normal pause between the first and second vaccination was greater than 7 to 10 days for some animals.

The feeding ration of the adults from February to December 1941, consisted of 50 per cent horse meat; 10 per cent glandular meat; 12 per cent fish (sole trimmings—ground and frozen in 30-pound tin cans at the Coast. When a shortage of fresh frozen fish existed, canned dark eat from tuna was substituted); 18 per cent cereal; 5 per cent salmon meal; 5 per cent vegetables (carrots, beets, and tomatoes); and 0.25 per cent dried yeast. Salmon oil was fed two or three times a week at the rate of 1 pint at each feeding for 500 animals. One drop of wheat-germ oil was given with the food to each mink daily during February, March, and April. After May 1, the owner fed fluid milk to all females with kits, and to all kits twice daily until they reached 8 to 10 weeks of age. This was evaporated milk mixed with 1.5 parts of water. As the kits grew, the quantity of frozen ground sole trimmings was increased to 25 per cent, to supplement a reduction in horse meat. Some blood was used in the ration along with grass clippings (mostly clover) which supplemented vegetables. On September 1, the cereal was reduced to constitute only 12 to 15 per cent of the feed. This practice was followed until pelting time. Dried yeast was discontinued after July. The liver used was that obtained from horses killed on the ranch for mink feed.

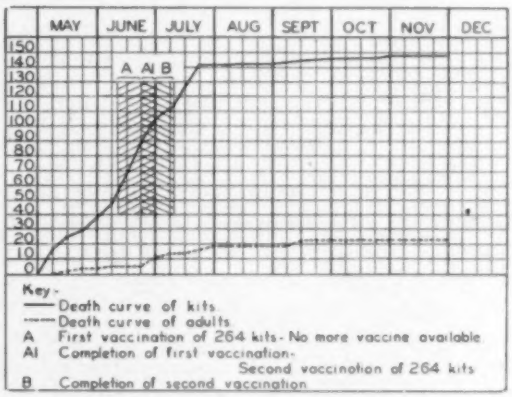
RESULTS

The results of this coöperative field experiment have been compiled in the form of a graph for the convenience of a more comprehensive study.

This graph shows in the column on the left the total number of fatalities; and the span of time is indicated by the succeeding vertical columns. The death curve can readily be followed for the kits in comparison to that of the adults. The upward advance of the death curve would have undoubtedly been checked at an earlier date if vaccine had been administered to all of the animals at the onset. A slight break in the curve can be noticed, however, in approximately two weeks following the initial vaccination of 264 kits on June 10. A definite leveling-off of the curve was accomplished approximately two weeks after the completion of the second vaccination. In other words, it would be reasonable to conclude that the losses sustained for one month—from the third week in June to the third week in July—could have been kept to a minimum if a strict program of vaccination of all animals had been possible.

Not all the losses which occurred from May 1 to the latter part of July were due to distemper. One may expect a certain percentage of fatalities in kits and adult minks during the kit season. Nine kits and four adults were received for autopsy and the preparation of vaccine during this period. By the history and symptoms, all

Graph 1. Results of Field Experiment.



13 died from distemper. However, no typical inclusion bodies were found in the bladder smears from two of the minks examined. These were adult minks that showed marked clinical symptoms of distemper by the presence of purulent eyes, nose complications, and swollen feet. These symptoms are often found in minks where distemper has run a long course, and frequently no inclusion bodies can be found in these cases. The presence of inclusion bodies in the epithelial cells do, however, contribute to a positive diagnosis of distemper.

The vaccination of the adults was not made in a systematic manner. A total of 30 adults were not vaccinated. After July, the death curve for the adults leveled off as did that for the kits. This point alone gives evidence to the resistance acquired by

aged animals, taking into consideration that no further losses were reported in the adults.

The deaths of eight minks were reported from July 23 to December 1. On September 23 the owner sent an adult to the laboratory for observation because it had symptoms of inactivity and occasional fits. This animal died in transit. Typical inclusion bodies were found on autopsy. Another adult dying near pelting time showed typical inclusion bodies. Both animals had received one vaccination about July 1. The deaths of the remaining six animals were attributed to various miscellaneous causes. From the bacterial cultures made of the animals sent to the laboratory for examination, no specific bacteria that may have contributed to the cause of the epizoötic were isolated, although it is probable that the purulent secretions were the result of bacterial action.

DISCUSSION

The virtue of a formalized tissue vaccine is evident from this report and other similar practical field tests. We are not familiar with any commercial product of the type used in these operations, but it can be successfully produced by a practicing veterinarian for specific administration in the outbreak involved. He need have little or no equipment other than his usual stock supply of instruments and facilities.

This vaccine has its shortcomings, as do many others used in preventive veterinary medicine, although if properly prepared its administration early increases its value. Reactions of the body tissues within the mink require time to develop a resistance to combat the virus if exposed at a later date. Experiments to determine the duration of such a resistance have not progressed sufficiently to warrant a discussion at this time. Losses can be expected from the time a positive diagnosis of distemper is made until the completion of the second vaccination. This span may cover a variable number of days. However, the minimum time required for the preparation of an effective and safe vaccine after sufficient numbers of infected minks are obtained is seven to eight days. A shorter period of time used in the preparation of a vaccine might result in an ineffective or contaminated product which may do more harm than good.

Healthy, well-fed, adult minks build up a resistance more effectively than do those suffering from malnutrition or those combating bacterial or parasitic infections. Young kits from unimmunized adult females are highly susceptible to distemper.

The death rates of the kits and adults were observed only to the end of November. At that time, many kits and some adults were pelted. The occurrence of distemper in two adults in the fall was believed to have been due to the omission of the second vaccination. It would appear possible that a more effective or lasting immunity can be established by two vaccinations given at intervals of seven to ten days. During the months of December and January no losses were reported by the owner. The fact that the virus was present on the ranch as late as November and no epizoötic recurred indicates that an immunity was established in the kits for at least five to six months.

Attempts will be made to observe the minks of this ranch through the coming kit season to determine the possibility of the disease recurring in the adults or their offspring.

SUMMARY

It is pointed out that the losses sustained on this ranch from distemper as described, would amount in value to several thousand dollars. It is believed, however, that losses amounting to many times this sum would have followed had the disease not been checked.

Many outbreaks of distemper in minks should be studied better to determine the value of tissue vaccine as a basis for future development in control methods. Objections to this form of immunization were observed in the delay of producing protection because of the time required to prepare the vaccine and to build up resistance within the animals' bodies following vaccination.

Further studies in the characteristics of distemper virus affecting minks and foxes

Synthetic Thyroprotein, a New Drug Available in Veterinary Practice

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IN MAN, the treatment for thyroid deficiency has been recognized for many years. Fortunately, in contrast to many endocrine dysfunctions, oral administration of the fresh or dried thyroid gland containing the active hormone, thyroglobulin, remedies these conditions. There are countless thousands who daily depend for their well-being upon thyroid therapy.

In veterinary practice, thyroid medication has been practiced rarely, if at all, in the larger domestic animals, even though there are many animals which would benefit from such treatment. This has been due to the relatively high cost of treatment. In ruminants, there appears to be rather high destruction of the active principle in the digestive process when desiccated thyroid is fed. While the injection of the crystalline thyroid hormone-thyroxine is possible, the cost of this material has been high, even though a synthetic method of formation has been discovered.

Consequently, while veterinary science has recognized the value of thyroid treatment for domestic animals, economic considerations have prevented its wide use. The object of this paper is to report briefly upon the production of a synthetic thyroprotein of high potency which may make possible its general use by veterinary practitioners for all types of domestic animals and in a variety of endocrine disturbances.

For many years, the Department of Dairy Husbandry of the Missouri College of Agriculture has been engaged in a study of the factors influencing the secretion of milk. Because of the intimate influence of the endocrine glands in stimulating the growth of the udder and the secretion of milk, study has been given to the relation of the pituitary to the udder, the thyroid, adrenals, and other factors which might influence the milk yield. When, in 1934, Graham[1, 2] announced that thyroidectomy of dairy cows depressed milk secretion and that feeding of thyroid glands or the injection of thyroxine actually increased not only the yield but the fat content of milk, the Missouri Station workers immediately began a study to determine whether confirmation could be obtained. Two research bulletins[3, 4] were published, giving the results of their observations. Both thyroid feeding and the injection of thyroxine promptly stimulated an increased yield of milk of definitely higher fat composition. When the injection or feeding of thyroid was discontinued, the yield of milk returned to normal. This effect was produced at any time during the declining period of lactation. A few cows at their peak of production did not show an increased yield of milk, but maintained a high level of milk

Contribution from the Department of Dairy Husbandry, Missouri Agricultural Experiment Station, Journal Series No. 876.

[1]Graham, W. R., Jr.: The Effect of Thyroidectomy and Thyroid Feeding on the Milk Secretion and Milk Fat Production of Cows. J. Nutr., vii (1934), p. 407.

[2]Graham, W. R., Jr.: The Action of Thyroxine on the Milk and Milk Fat Production of Cows. Biochem. J., xxxviii (1934), p. 1368.

[3]Herman, H. A., Graham, W. R., Jr., and Turner, C. W.: The Yield and Composition of the Milk of Dairy Cows and Goats as Influenced by Thyroxine. Mo. Agr. Exp. Sta. Res. Bul. 317, (1940).

[4]Ralston, N. P., Cowsert, W. C., Ragsdale, A. C., Herman, H. A., and Turner, C. W.: The Yield and Composition of the Milk of Dairy Cows and Goats as Influenced by Thyroxine. Mo. Agr. Exp. Sta. Res. Bul. 317, (1940).

(*Continued from preceding page*)

are necessary in the development of more efficient control measures. Development of more effective methods of treating infected minks should also be given consideration. It is probable that a good ration is helpful. Under present world conditions the increased cost of feeds may force ranch owners to alter their rations. Such changes made on ranches where distemper virus is present may increase the losses.

production, far above their normal rate of persistency.

These experiments showed the greatest practical possibilities, for it became possible for dairymen, for the first time, to overcome the obstacle in dairy cattle of low inherited ability to secrete the hormone of the thyroid gland which appears, in many cases, to be an important handicap to maximum milk secretion.

However, for the realization of this objective, one hurdle remained. Both desiccated thyroid and thyroxine were very expensive, and the increased milk and fat production obtained cost more than they were worth. The question arose, could a cheaper thyroid product be prepared? The synthesis of crystalline thyroxine was looked into. It was found that, at best, the process was rather complicated and would not result in cheap material, even though the demand was increased. An alternative possibility was the iodination of protein in such a manner as to produce thyroidal material. The literature revealed that certain European investigators had been working in this field with promising results. One group of investigators had actually iodinated the milk protein-casein, and then digested the protein and recovered small yields of pure thyroxine.

The object of the work began at the Missouri Station was to attempt to produce a preparation of such high thyroidal potency that digestion of the preparation would not be required; in other words, one would be able to feed the original iodinated protein at a relatively low cost for the amounts required for productive purposes. In our earlier work in this field, we were able to produce *thyroproteins* that exerted a thyroidal effect equal to 1 per cent of that of thyroxine when tested by oral administration and about 2.7 per cent of the thyroxine response when injected. Comparative assays indicated that these products were somewhat more active per unit weight than U.S.P. thyroid powder when tested by the same mode of administration[5].

More recently, by studying each step of the iodination process, it has been found possible to produce *thyroproteins* which consistently show a 400 per cent increase in thyroidal activity, as compared to our earlier preparations. Thus, these new preparations show thyroidal activity of about 4 percent of thyroxine when assayed by oral administration, or approximately 11 per cent of the thyroxine response when injected.[6] Thus, we have succeeded in converting a protein of nonthyroid origin (casein) into an artificial *thyroprotein* with thyroidal activity far above that of the natural thyroid gland. The question arises whether the conversion of the iodinated protein to *thyroprotein* occurs in the process of iodination or in the process of digestion. Since the iodinated protein shows higher thyroidal activity when injected than when fed, it would appear that the conversion to artificial *thyroprotein* occurs in the iodination process.

This new product can be manufactured at a much lower cost than the natural thyroid powder, and is at least four times more potent as well, so that it will be possible at last to use synthetic *thyroprotein* in the treatment of thyroid deficiencies of all types of domestic animals at a nominal cost.

That this material will substitute for the natural thyroid secretion has been shown in experiments in our laboratories. When young goats are thyroidectomized, they soon stop growing. They begin to show all the signs of cretinism. The hair and skin become coarse and thick. The loss of muscular tone results in a "pot belly". The animals lose their bright, alert appearance, becoming apathetic and torpid. Their feed consumption is greatly reduced. When *thyroprotein* was fed to such animals, their appearance rapidly changed for the better, they improved in every particular and growth was resumed. Animals on complete replacement treatment have grown at the normal rate.[7] It is of particular interest

[5]Reineke, E. P., Williamson, M. B., and Turner, C. W.: The Effect of Progressive Iodination on the Thyroidal Activity of Iodinated Casein. J. Biol. Chem., cxliii (1942), p. 285.

[6]Reineke, E. P., and Turner, C. W.: Formation *in vitro* of Highly Active Thyroproteins, Their Biologic Assay, and Practical Use. Mo. Agr. Exp. Sta. Res. Bul. 335, (1942).

that during nearly a year of continuous feeding of *thyroprotein* to these animals, no toxic effects or undesirable symptoms that could be attributed to the treatment have been noted.

Not only will it stimulate growth in thyroidectomized animals, but in normal experimental animals, when fed in very small amount, as a supplement to the secretion of the thyroid glands, it has been observed to increase the growth rate, even during the period of rapid growth, by as much as 25 per cent.[8] This may be due in part to the increased appetite, with a resulting increased feed consumption. If larger domestic animals will respond similarly, the feeding of small amounts of this product may be an effective method of speeding up the rate of growth and sexual maturity, so that animals can be brought into production or sold at an earlier age.

This should be especially true of the meat or fat type of stock. To obtain maximum fattening ability, the breeder of fat stock has had to sacrifice rapidity of growth, because growth is controlled in part by the thyroid. Animals with an overactive thyroid do not fatten readily. To compensate for these two opposing factors, it should be possible to feed the *thyroprotein* to growing fat stock and thus hasten their maturity, then remove it from their feed and fatten them rapidly.

In human medicine, one of the most common uses of thyroid is to remedy reproductive troubles in both male and female. Doctor E. Novak, in his book on "Menstruation and its Disorders", stated, "In many years, the most satisfactory of all the organic extracts in the treatment of menstrual disorders is thyroid extract". Minor degrees of hypothyroidism and lowered basal metabolism are the frequent cause of irregular cycles.

It would seem reasonable to believe that in a certain percentage of nonbreeding animals, the cause of their failure to conceive may be due to a slight hypothyroidism. Here again, the fat type of animal might be expected to respond most readily, although the fact that even most dairy cows respond to *thyroprotein* by increased milk production indicates that slightly more than the normal secretion of the thyroid gland is beneficial in many cases.[9]

Thyroid may be indicated, also, in cases of habitual abortion. Doctors Mazer and Goldstein, in their book on the "Clinical Endocrinology of the Female", say, "During pregnancy there is an increased functional activity of the thyroid gland and metabolism, commensurate with the combined needs of both mother and child. Failure of the thyroid to meet the larger demands made upon it may result in abortion. The thyroid secretion, like the ovarian and pituitary secretions, no doubt participates in the morphological metamorphoses of the uterine mucosa in the course of nidation and pregnancy. This is probably the mechanism by which habitual abortion in certain cases of relative thyroid deficiency can be explained".

After the period of growth in domestic animals, the secretion of the thyroid gland gradually slows down; the metabolism of such animals decreases; they gradually fatten; breeding animals (both male and female) become sluggish and their reproductive organs less effective. In males, the semen may lose its fertility, and in females, the ovaries may become dormant and estrus cycles become irregular. By replacement therapy with thyroid material, the slightly hypothyroid animal can be returned to a normal condition of metabolism, and accompanying this change there is usually a marked improvement in reproductive ability. In males, the normal sex drive returns and the quality of the semen improves. In females, the dormant ovary returns to an active condition and normal estrus cycles are resumed.

As indicated previously, this condition may occur most frequently in the fat type of cattle, sheep, and swine, where selection

[7]Reineke, E. P., and Turner, C. W.: Growth Response of Thyroidectomized Goats to Artificially Formed Thyroprotein. Endocrin., xxix (1941), p. 667.

[8]Koger, M., Hurst, V., and Turner, C. W.: Relation of Thyroid to Growth. Endocrin., xxxi (1942), p. 667. (Also unpublished work).

[9]Reineke, E. P., and Turner, C. W.: Increased Milk and Milk Fat Production Following the Feeding of Artificially Formed Thyroprotein (Thyrolactin). J. Dairy Sci., xxv (1942), p. 393.

for rapid fattening has been practiced, with a natural reduction in thyroid activity. Such animals are probably close to the border line of hypothyroidism, and the trend downward with advancing age might be expected to show its effect in impaired breeding efficiency sooner than in animals with higher initial thyroid activity.

In older, draft type horses, their reduced vigor may be due, in part, to a gradual reduction in thyroid activity. It could be expected that added thyroid would increase their appetite and general condition.

Many other similar conditions will come to mind where added thyroid might be expected to improve the condition of the animals and increase their likelihood of recovery from other pathological conditions, simply as a result of an improvement in appetite and physical condition.

Obviously, considerable research will be required to establish the proper rôle of thyroid therapy in farm animals. In spite of the fact that thyroid substance in various forms has been available in medical practice for more than half a century, its application in veterinary and animal husbandry practices still remains a virgin field. In the scattered instances where thyroid treatment has been attempted, it has been the usual practice to administer massive doses that approached the toxic level, and, therefore, the beneficial effects that might be obtained with therapeutic doses have not been observed. It is generally true that the effect to be obtained following thyroid treatment depends upon the level at which it is administered. Small doses result in an increased growth rate, increased feed consumption, and greater storage of protein in growing animals. Massive doses, on the other hand, retard growth and deplete the body stores of fat, protein, and carbohydrate. In mature animals, particularly in types with a relatively low degree of thyroid activity, a low dose of thyroidal material can be expected to increase general vigor and prevent in some degree the decline in reproductive functions, such as breeding efficiency, taking place during senescence. With excessive doses, however, one could expect undesirable effects, such as loss of condition, hyperirritability, and impairment of breeding efficiency. It is apparent, therefore, that the establishment of an effective form of treatment for domestic animals will require extensive studies on broadly graduated dosage levels. Inasmuch as species differences of response to such treatment undoubtedly exist, it will be necessary to establish the therapeutic range of dosages for each type of animal concerned. From the experimental standpoint, the physiologic basis of thyroid therapy could be established by use of standard thyroid powder, thyroxine, or artificial *thyroprotein*,* such as the material described earlier in this paper. Whatever the type of material used, it is extremely important that its actual thyroidal potency be known and reported if the results are to be repeatable in practice. The cost of thyroid substance and thyroxine definitely limit their usefulness on a practical scale for work of this nature. However, the artificial *thyroprotein* now available will fully meet the requirements for an effective thyroidal substance at reasonable cost.

*Dr. W. R. Graham, Jr., of the Cerophyl Laboratory, Kansas City, Missouri, has made the artificial *thyroprotein* according to our procedure. This firm is in a position to supply it to veterinarians for experimental use.

Corrigenda.—The author of the article entitled "Development and Management of a Blood Bank," published in the October issue of the Journal, desires to change the figures 4.43% to 0.43% in the formula for the preservative solution appearing on page 266, line 4, so that the line will read: Sodium Citrate—0.43%.

• • •

We cheerfully correct the typographical error in the editorial on "Warbles and Leather" in the December issue where credit is given to Jones and *Love* instead of Jones and *Lowe*. The author referred to is C. D. Lowe, Extension Service, U.S.D.A., and a member of the Committee on Public Relations of the AVMA; also the statement referring to the grub treatment should read powder *and* wettable sulfur instead of *or*; the amount of spray needed should read *one-half* gallon per head.

Production of Anemia in Dogs Due to Feeding Onions

CARL F. SCHLOTTHAUER, D.V.M., and GEORGE H. BERRYMAN, M.S.
Rochester, Minn.

ONIONS commonly are used in various diets prepared for human use. Since dogs can be, and frequently are, maintained on the same kind of food that is eaten by man, there has arisen the question of possible toxic effects due to the onion content of the diet. Sebrell[1] and Gruhzit[2] have shown that the daily feeding of raw or cooked onions to dogs in quantities of 15 Gm. or more for each kilogram of body weight causes marked but transient anemia. The maximal effect was noted by them on about the seventh to eighth day. The erythrocytes decreased in number and the leucocytes showed a tendency to increase. Gruhzit observed an erythrocyte count of 1,560,000 and a leucocyte count of 62,000 in each cubic millimeter of blood on the eighth day in a dog receiving autoclaved onion juice. He noted that after the maximal destruction of erythrocytes a tolerance for onions and their fractions seemed to develop and further feeding had no effect on the blood elements. We were desirous of learning whether or not the daily feeding of large quantities of raw onion for a period of several weeks would cause recurrence of the symptoms of anemia and whether or not any organic lesions would be demonstrable.

Two young dogs were used in this experiment. Dog 1 was approximately 3 months of age and dog 2 was 5 months. The dogs were confined in individual cages and were maintained on a diet of commercially prepared canned dog food for ten days before raw onion was added to their diet. On the eleventh day 20 Gm. of fresh, finely chopped raw onion was added to the canned dog food diet of each animal. The daily allowance of raw onion was increased slowly. A level of 10 Gm. or more of onions for each kilogram of body weight was attained on the fifteenth day in dog 1 and on the seventy-first day in dog 2. Because of progressive gain in body weight of both dogs a constant ratio of onions and body weight was not maintained. These data are recorded in tables 1 and 2. Neither of the dogs seemed to object to eating onion in its diet, but dog 1 showed a tendency to vomit when the onion content was first increased to 12 Gm. for each kilogram of body weight.

Both dogs appeared anemic after the third week of the experiment. All visible mucous membranes appeared blanched or pale but the dogs seemed otherwise normal. This visible effect disappeared when the onion was withheld from the diet for two or three days or if a definitely mild variety of onions was used. We also noted that the most effective results were obtained when fresh chopped onion was used. Onions that were chopped and then stored in a refrigerator seemed to lose their ability to produce symptoms of anemia. Since we were not interested in the early microscopic changes in the blood elements of dogs receiving onion in their diet, we did not make blood counts until the sixty-fifth day of the experiment. Both dogs revealed essentially normal blood counts at that time, but marked fluctuation in the counts was noted thereafter. The erythrocytes showed a tendency to decrease and the leucocytes simultaneously increased in number. Marked effects were not noted until the one hundred and forty-ninth day. Blood counts made on this date revealed 2,662,000 erythrocytes and 10,300 leucocytes in each cubic millimeter of blood in dog 1 and 3,900,000 erythrocytes and 13,800 leucocytes in dog 2. Both dogs appeared anemic but they were otherwise normal.

On the one hundred and fifty-third day dog 1 appeared stuporous and ate only a

Division of Experimental Medicine, Mayo Foundation.
Fellow in physiological chemistry, Mayo Foundation.

[1]Sebrell, W. H.: An anemia of dogs produced by feeding onions. Pub. Health Rep., xlv (May 23, 1930), 1175-1191.

[2]Gruhzit, O. M.: I. Anemia of dogs produced by feeding of the whole onions and of onion fractions. Am. J. M. Sc. clxxxi (June, 1931), 812-815.

small portion of its daily ration of food. Anorexia was complete on the following day and the dog was found dead in its cage on the morning of the one hundred and fifty-fifth day. Examination at necropsy failed to reveal the cause of death. All the tissues appeared anemic but other microscopic lesions were absent. The bone marrow and various organs were examined microscopically. The only lesions noted were small foci of degeneration and cellular infiltration in the mucosa of the jejunum and ileum but these did not appear severe enough to cause death. Several large nematodes, *Belascaris marginata*, were present in the intestine. They were alive and apparently had not suffered any ill effects from the onion ingested.

TABLE 1—Effect of Feeding Onions. Dog 1

Days*	B.W.K.†	O.F.D.G.‡	G.O.K.W.§	Leucocytes (Per Cubic mm. of Blood)	Erythrocytes (Per Cubic mm. of Blood)
1	3.4	20	5.9		
8	4	30	7.5		
15	4	40	10.0		
22	4.8	50	10.4		
28	4.8	50	10.4		
36	5.4	50	9.3		
50	6.1	50	8.2		
57	6.6	70	10.6		
65	7.0	70	10.0	12,700	6,940,000
71	7.2	90	12.5	14,000	5,800,000
77	7.5	90	12.0	18,000	5,200,000
85	8.1	90	11.1	15,000	5,400,000
107	9.0	90	10.0	20,700	4,400,000
117	9.3	90	9.7	13,100	5,170,000
125	9.4	90	9.6	19,700	4,940,000
132	9.5	150	15.8	13,700	4,540,000
149	9.6	150	15.6	10,300	2,662,000
153					Anorexia, incomplete
155					Died

*Days from beginning of experiment.
†Bodyweight in kilograms.
‡Grams of onions fed daily.
§Grams of onions per kilogram of bodyweight.

Dog 2 appeared to be anemic but it continued to eat well and gain in weight. It was maintained on the diet of canned dog food and raw onion for 196 days. During the last 64 days of the experiment it received daily 15 to 18 Gm. of fresh, finely chopped raw onion for each kilogram of body weight. This dog's erythrocyte count varied from 3,700,000 to 5,490,000 and the leucocytes varied from 12,800 to 25,100 in each cubic millimeter of blood. On the hundred and ninety-fourth day, examination of the blood revealed 3,700,000 erythrocytes and 23,800 leucocytes but the dog's appetite was normal and it appeared mentally alert and active. Since it seemed doubtful that continued feeding of onion would cause further effects, the experiment was terminated on this date. The dog was destroyed by administration of a lethal quantity of pentobarbital sodium and necropsy was performed immediately. All the tissues appeared anemic but other gross lesions could not be demonstrated. Microscopic examination of the bone marrow and various organs was made. There were some regions of cellular infiltration in the mucosa of the small intestine. All the other organs and tissues were essentially normal microscopically. There were no intestinal parasites present in this dog at the termination of the experiment.

TABLE 2—Effect of Feeding Onions. Dog 2

Days*	B.W.K.†	O.F.D.G.‡	G.O.K.W.§	Leucocytes (Per Cubic mm. of Blood)	Erythrocytes (Per Cubic mm. of Blood)
1	4.1	20	4.9		
8	4.7	30	6.4		
15	4.5	40	8.9		
22	5.2	50	9.6		
28	5.2	50	9.6		
36	5.4	50	9.3		
50	6.8	50	7.4		
57	7.1	70	9.9		
65	7.5	70	9.3	15,700	5,220,000
71	7.7	90	11.6	14,000	5,000,000
77	7.8	90	11.5	16,000	4,600,000
85	8.6	90	10.5	18,000	5,100,000
107	9.4	90	9.6	25,100	4,310,000
117	9.6	90	9.4	13,000	5,170,000
125	10.0	90	9.0	12,800	5,460,000
132	10.0	150	15.0	15,900	5,030,000
149	10.8	150	13.9	13,800	3,900,000
160	10.9	200	18.3	13,900	4,870,000
167	11.6	200	17.2	17,200	4,680,000
174	12.0	200	16.7	24,300	4,240,000
188	12.2	200	16.4	20,400	5,490,000
194	13.0	200	15.4	23,800	3,700,000
196					Destroyed

*Days from beginning of experiment.
†Bodyweight in kilograms.
‡Grams of onions fed daily.
§Grams of onions per kilogram of bodyweight.

Higgins[3] fed onion juice and fresh raw onion to rats but was unable to produce effects similar to those produced in dogs.

[3]Higgins, G. M.: Personal communication to the authors.

The quantities of fresh onion juice fed to the rats represented amounts of onion per kilogram of body weight far in excess of the amounts fed to the dogs. It is accordingly suggested that there may be a species difference in the type of reaction elicited by this dietary regimen.

SUMMARY

The effects of feeding fresh raw onion to dogs and fresh onion juice to rats (by intubation) were studied.

In the quantities used, the following results were noted:

In dogs, there was a tendency toward fluctuation in the cellular elements of the blood, the erythrocytes tending to be decreased in number and the leucocytes simultaneously increased in animals receiving fresh raw onions.

The oral mucosae of these animals appeared to be consistently paler than normal.

No other pathologic symptoms were apparent, either grossly or microscopically.

Onion perhaps can not be classed as a vermifuge.

The cause of death of one dog was not determined definitely but the death was thought to be due to some toxic effects of the onion ingested.

The administration of fresh onion juice to rats in quantities relatively higher than to dogs was apparently without effect.

Successful Turkey Management*

In growing turkeys many lives can be saved by helping poults to get off at an early start. . . Crowding results in losses. For 180 poults a 10 x 12 foot pen is required. Ground corn cobs or wood shavings is the best bedding. Where sand or gravel is used, the litter should be covered with sacks the first five days to prevent the poults from eating it. Thereafter, when they begin to eat from feeders there is less danger from this habit. Keep litter dry and change it frequently. Cleaning, scrubbing, disinfecting are essential. Lukewarm water in sanitary fountain skirting the hover is best and the feeders should be filled to overflowing. For 1,000 poults, 200 linear feet of feed troughs should be provided. After eight weeks double the space. Poults are taught to drink by dipping the beak in lukewarm water and making certain that they have swallowed. Likewise during the first two days they must be taught to eat. Thousands die from not eating within the first 48 hours. During the first week poults are urged to bed down near the edge of the hover to prevent chilling. A wire fencing encircling the hover will prevent wandering away from the hover. A small electric light at the edge of the hover attracts poults toward the

*A book review.

The Food for Freedom Objectives

In spite of the rumors that farms are being abandoned, of crops rotting in the fields, and of cows going to the butchers, experts on American agriculture, including Secretary Wickard, agree that the figures above are attainable, barring

	1942	1943	
Hogs	10,800,000,000	13,800,000,000	lbs.
Cattle	10,160,000,000	10,910,000,000	"
Milk	120,000,000,000	122,000,000,000	"
Chickens	3,118,000,000	4,000,000,000	"
Eggs	4,414,000,000	4,780,000,000	dozen
Corn	91,098,000	95,000,000	acres
Wheat	53,427,000	52,500,000	"
Soybeans (for oil)	10,900,000	10,500,000	"
Peanuts	4,173,000	5,500,000	"
Cotton	24,005,000	22,500,000	"
Potatoes	2,845,000	3,160,000	"

unusual weather conditions. The support of not less than 90 per cent of parity prices is promised to the farmers. The dislocation of man power is calculated predictively.

heat and also prevents wandering away from it. The first ten weeks is the critical period of a turkey's life. Feed lightly during that time but see that the ration is a balanced one in essential proteins, vitamins and minerals.

The third week begin sprinkling small amounts of scratch grain over the mash. At the fifth week they can eat whole wheat and coarse cracked corn and at six weeks the feed should be three-quarters mash and one-quarter scratch grain. During the first ten weeks average poults consume about 6½ pounds of mash and 1½ pounds of scratch feed. Up to ten weeks the flock should be given "starter mash" and at eleven weeks it should be fed entirely on "grower mash" and supplementary grain. Small-size grit is then sprinkled over the mash two or three times for a week. Thereafter, keep small-size grit in the grit hopper at all times. Also provide oyster shell or calcium grit. Do not put new mash on top of mash in the trough. Push the old mash to one end and put the new in the cleaned trough. Fresh dry feed and stirring it encourages eating and eating makes growth.

A brooding temperature of 90 to 95 F., good ventilation, absence of drafts, segregation of the backward poults, elevated drinking fountains (1 inch above the bird's vent) of the sanitary type, metal feeders that are easy to clean, and keeping out visitors, are pointed out as requisites to successful results.

Poults are transferred to the range at from eight to ten weeks. The growing period is from 10 to 20 weeks and the finishing period from 20 to 30 weeks. Directions for care and for the equipment required during the range period include the warning to use no drugs in the case of illness without first consulting "your veterinarian." Have the water supply tested by a competent laboratory if there is any doubt as to its purity.

The management during the finishing period follows the classical rules for sanitation, feeding, watering, roosting, and removal of droppings, and stresses the importance of supplementary minerals to prevent "crooked breast" and other expressions of faulty food hygiene. "Minerals should constitute 2 per cent of the total feed" the booklet declares. Milk-moistened mash once daily is one of the finishing touches needed to set up feed consumption and to put the birds in dressing condition.

Going back to the starting point, the turkey-growing adventure begins with pullorum-tested flocks, the incubation of only the best eggs, expert culling of breeding stock, modern hatcheries run by trained men, prompt delivery of brooder poults, and getting off to a good start through obedience to the rules mentioned.

Outbreaks of serious illness are approached by immediate segregation of the sick and having a veterinarian diagnose the trouble. "Never use drugs without specific instruction" is emphasized, and the keeping of accurate mortality records is regarded essential.

FEEDS

"Turkey Starter" containing 24 per cent protein, has the following components: animal protein (meat meal, meat and bone scraps, dried milk); vegetable protein (soybean meal, wheat bran and middlings, alfalfa leaf meal); vitamin B complex (wheat bran and middlings); vitamin D (360 AOAC chick units, per lb.); vitamin A (3,600 I. U. per lb.); vitamin G (dried milk products, soybean meal); calcium and phosphorus (meat and bone scraps, wheat bran and middlings, soybean meal, ground limestone); manganese (*per se*, wheat bran and middlings); sodium chloride and iodine (iodized salt); and trace minerals (ground oats). "Turkey Grower" follows the same general pattern but contains a lower amount of protein (21 per cent) and is fed choice-free with home grown grains and roughage. [*How to Grow Turkeys for Profit by technicians of the Nutritional Research Laboratory. Swift & Company, Chicago. Booklet. 20 pages, Two colors. Illustrated. 1942.*]

The dark meat of poultry contains twice as much vitamin B as the light meat.—*Science New Letter.*

SURGERY & OBSTETRICS
AND PROBLEMS OF BREEDING

Submucous Resection, Surgical Correction Prolapse of the Rectum

HARRY W. JOHNSON, D.V.M.
Fort Collins, Colorado

THERE HAS BEEN an increasing need for an improved surgical procedure for the correction of irreducible prolapse of the rectum. This condition occurs in various species of animals with the highest incidence in the bovine.

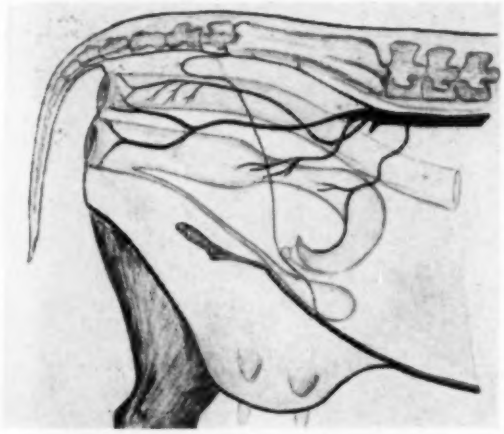

Fig. 1. Position and relationship of the various structures involved in prolapse of rectum.

It is easy to assume that prolapse of the rectum is a result of straining; however, it is sometimes difficult to determine the primary factor or factors that cause the straining. Probably a nonspecific or a specific diarrhea is the most frequent and important cause. Post-coccidial irritation is the most frequent specific element. Obstinate constipation may cause irritation to the mucous membrane, although this is probably infrequent. Occasionally, protrusion of the rectum is a complication to prolapse of the vagina in the female. Injuries to the mucous membrane from faulty manipulation or false copulation may result in straining.

Clinically, prolapse of the rectum presents a protrusion of a variable portion of the mucous membrane and its underlying structure through the anal orifice. At first, the onset is insidious and the mass recedes spontaneously; but later, since the condition is a progressive one, the protruding

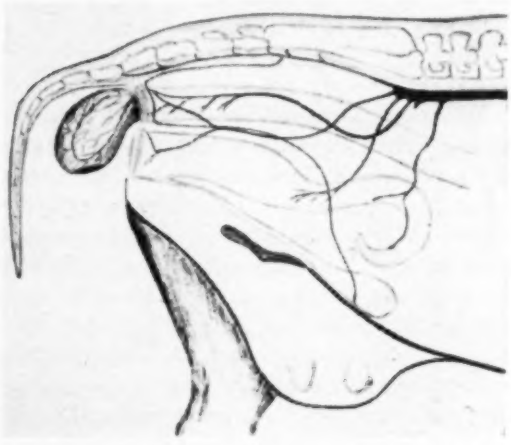

Fig. 2. Prolapse with backward displacement of the peritoneum and blood vessels.

mass becomes congested, shows considerable swelling, and there is severe straining. When this is encountered, the prolapse can be handled by replacing the tissue to its original position by gentle taxis. It is usually necessary to insert a purse string suture in the skin to prevent recurrence. It is advisable to apply a bland oil containing some soothing agent or some mild

Presented before the Section on Surgery and Obstetrics, 79th annual meeting AVMA, Chicago, Aug. 25, 1942.

astringent to the inflamed mucosa. The later stages are most frequently encountered. When the rectal mucosa protrudes for a short time, the sphincter ani becomes dilated. The mucous membrane is irritated by the tail, it becomes dry, carious birds may injure it, and there is adhesion of fecal material. When the prolapsus remains outside the anal aperture for a period of time,

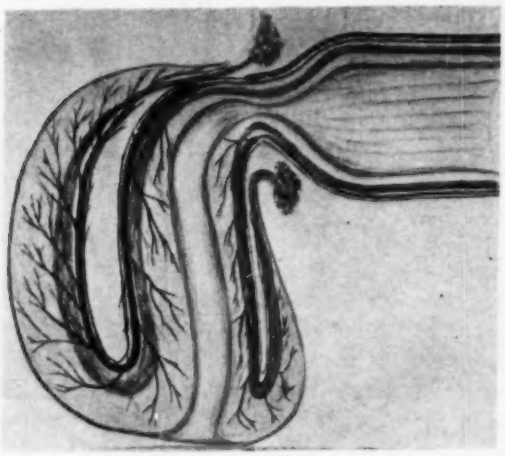

Fig. 3. Prolapse showing edema and passive congestion from constriction of vessels.

then, because of pressure on the venous return exerted by the sphincter muscle, the exposed bowel becomes edematous, the parts thickened, and frequently the mucosa undergoes necrosis. On section, varying degrees of looseness are noted between the mucosa and the submucosa. As the rectal opening is constricted, there is an interference in the normal passage of feces. The animal continues to strain, becomes depressed, goes off feed, and in some instances is too weak to endure surgical interference. In any event, these symptoms have terminated in an irreducible mass that requires surgical removal.

The accepted operation consists of complete amputation by transverse section through all the layers of the exposed tract. The transected ends are held together with several mattress sutures. This method has certain disadvantages: (1) The serous coat is exposed, allowing infection to enter the peritoneal cavity. If the prolapse is removed posterior to the reflection of the peritoneum, the retroperitoneal fat and connective tissue are exposed to infection. (2) The main blood vessels are severed and frequently cause postoperative hemorrhage. (3) Violent and persistent straining may follow. (4) A stricture of the rectum results immediately, which in some instances prevents the normal escape of feces; and (5) This operation causes the sacrifice of healthy tissues.

A more refined surgical technique has been used with success in our clinic for the past four years.

Preliminary operative preparation consists of scrubbing the prolapsus, the buttocks, and the tail thoroughly with warm

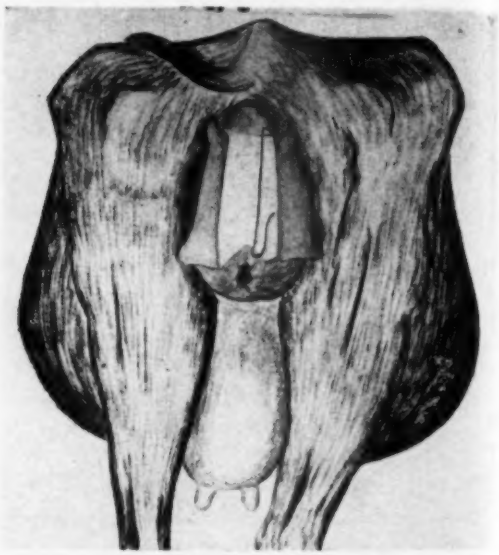

Fig. 4. First Step of Operation.

water and soap. Epidural anesthesia is the method of choice. The preferred anesthetic is one per cent procaine hydrochloride; however, local infiltration can be used. The rectum is packed with cotton to prevent the passage of feces. An enema is unsatisfactory as the fecal material is made more fluid and in nearly all instances the animal will pass some of the watery material during the operation. This contaminates the field and requires additional time to clean the area. Following packing of the rectum, traction is exerted on the prolapse; then two, eight-inch, fourteen-gauge needles are

used to fix the tissue. One is placed perpendicularly, the other transversely through the healthy tissue close to the anal opening. This prevents the return of the diseased tissue into the pelvis until the operation is complete.

The purpose of the new procedure is to remove the exposed inflamed mucosa, to decrease the length of the rectum, and to leave the unaffected tissue. The method consists of making a longitudinal incision on the dorsal surface through the mucosa. This incision extends from the healthy tissue at the anorectal line to the healthy mucous membrane at the apex of the prolapse. Then, circular incisions are made for a short distance at the anorectal line

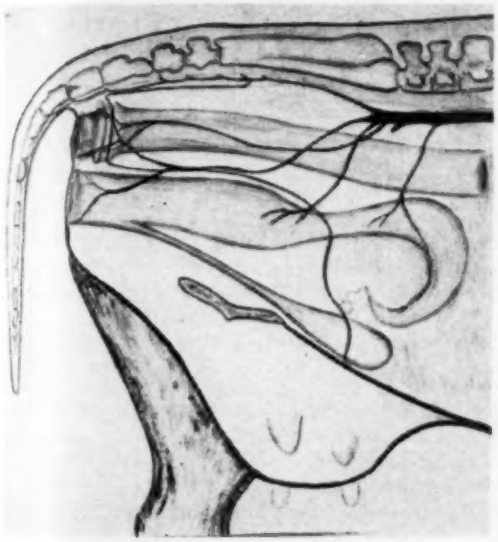

Fig. 5. Reduction following operation.

and the apex. By blunt dissection, a portion of the mucosa is separated from the prolapsed segment. This is usually easy because of the separation of the mucosa and submucosa by edema. The bleeding points are controlled. Catgut sutures are inserted beginning in the healthy tissue at the anorectal line and ending in the healthy mucous membrane at the apex. The first suture tied brings the apex of the prolapse toward the anorectal line. Several continuous sutures are then inserted and pulled tight. The circular incisions are extended, the blunt dissection is repeated, the bleeding points are controlled, and the suturing is continued. This procedure is followed until the mucosa is removed and the two ends of the mucous membrane are approximated. The two needles that hold the mass are removed. The cotton packs are withdrawn and the segment is replaced. It is advisable to insert a purse-string suture around the anal orifice to prevent recurrence of the prolapse.

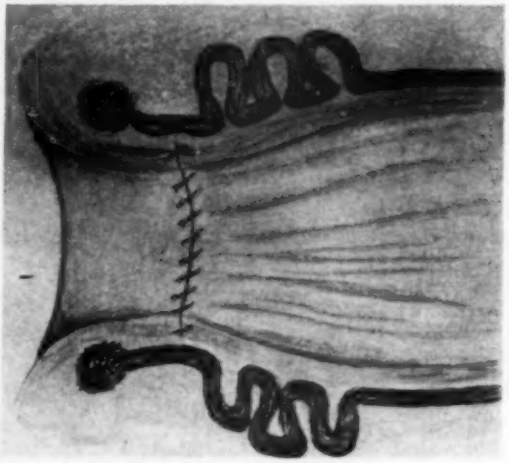

Fig. 6. Sutured mucosa following operation.

The postoperative treatment consists of confining the animal in a box stall for four or five days during which time enemas are given to allow for liberal passage of feces. The purse-string suture is removed at the end of one week.

This method has certain advantages: (1) The serous coat is not exposed, and therefore, the possibility of peritonitis and pararectal abscess is prevented. (2) The main blood vessels are not amputated; thus, there is less danger of postoperative hemorrhage. (3) There is less straining. (4) The lumen is not constricted to the extent of that in the former operation. (5) There is no sacrifice of healthy tissue. (6) Healing is more rapid.

Compare the quarreling Frenchmen (and us) with the fighting Russians for the answer why France is taking the count while Russia stays fit for the next round.

The Use of Diethylstilbestrol* for Retained Placenta in the Cow: Case Reports

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RETAINED PLACENTA is the failure of the fetal placental membranes to be discharged after parturition. Following normal calving, the placenta should be discharged within six hours.

The use of hormones for the expulsion of the placenta is a comparatively new field. Benesch (1930) states "There can be no doubt that in cases of retention of the membranes, recovery is assisted in a very marked manner by the administration of pituitary extract associated with ordinary local treatment." He refers to posterior pituitary extract, and recommends giving doses of 10 cc. immediately following parturition (Benesch, 1938).

Shaw (1938) gave pituitary extract to cows at calving time, or not later than one and a half hours afterward. In a herd of 100 cows so treated, one per cent had retained placenta, as compared to a herd of 47 nontreated cows of which approximately 10 per cent had retained placentas.

Fincher (1941) reveals that pituitary extract has been used on cows at the New York State Veterinary College for many years, immediately after parturition. More recently, they have given 2 cc. of progynon-B, a strong estrogen, immediately prior to pituitary extract.

Since the synthesis of the estrogenic hormone, stilbestrol, in 1938 (Dodd, *et al.)*, it has been used universally both in the medical and veterinary fields. This widespread use may be attributed to its many desirable features, as it is cheap in price, effective when given orally, as well as subcutaneously or intra-abdominally, and produces positive physiological results.

At an English veterinary conference (1942), it was revealed that 25 mg. of stilbestrol dipropionate had been used to expel the retained placenta from cows, and that after expulsion the genitalia cleaned up in excellent shape, all odors having disappeared.

Very recently, two cases of retained placenta were treated at this station with diethylstilbestrol:

Case 1.—A multipara (cow 2272), free from brucellosis, gave birth to a normal calf during the night of May 24, 1942. The following morning, the placenta was protruding about eight inches from the vulva, and had a strong, foul odor. Manual examination revealed it to be adhering tightly. At 11 a.m. on the 25th, she was given 25 mg. of diethylstilbestrol in oil solution subcutaneously. When observed on the 26th and the morning of the 27th, no change could be noted. The caretaker reported that the cow discharged the placenta in the afternoon of the 27th. When examined on the 28th, the odor had disappeared. Upon manual examination through the vagina, the cervix was found closed. Rectal examination revealed the uterus to be greatly reduced in size and to be apparently normal.

Case 2.—A multipara (cow 2308), with a history of two previous abortions and a continuously high agglutination titer to brucellosis, aborted an 8-month fetus on the night of May 28. She had retained the placenta following each of the previous abortions. Each time it was removed manually.

When observed on the morning of the 29th, the placenta was protruding about 12 inches from the vulva. At 10 a.m. she was given 25 mg. of diethylstilbestrol subcutaneously. There was no change noted the following day. On the 31st there was no change in the morning, but the caretaker reported that the cow discharged the placenta during the afternoon.

The results of the use of stilbestrol in the two cases mentioned warrant further trials of this drug in obstinate cases of retained placenta.

It is not believed, however, that stilbestrol should be used indiscriminately or as a routine procedure in all parturient cases, in the hope of preventing retention of the placenta. In the dosage mentioned, it should cause estrus in one to five days,

*The diethylstilbestrol was very generously furnished by the Winthrop Chemical Company, Inc., New York, N. Y.

Scrotal and Inguinal Hernia

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All scrotal hernias were originally inguinal hernias. Inguinal hernia is a condition in which a loop of the intestine, and sometimes the mesentery, migrate or protrude through the inguinal ring into the inguinal canal. Scrotal hernia is a condition in which the intestines drop on down into the scrotum.

Hernia of the abdominal viscera through the inguinal canal occurs only in male animals and in the female of the canine species. Inguinal hernia is more common in the pig than in other animals, and is congenital if not hereditary.

This condition frequently happens in stallions. It sometimes follows castration, particularly in old horses. It sometimes exists for years without causing any trouble. There is always the risk of strangulation, and attacks of colic in the stallion frequently denote its presence and should always be looked for in making an examination of colicky conditions in that animal.

This abnormality is quite common in the newborn of the equine species but disappears in many instances without surgical interference as the foal grows stronger and develops. Those cases in which the condition persists, after the colt is from 6 to 12 months old, probably will require operation, for the likelihood of recovery after that time is rare. When it is found necessary to operate, it should not be put off too long as strangulation might occur.

It is extremely rare that scrotal hernias in foals become incarcerated. A large proportion of foals at birth have a loop of the intestine in the inguinal canal or the scrotum.

Recovery occurs spontaneously in young colts. In young pigs, the case is just the opposite. They seem to grow worse with age.

In presenting this paper, the writer proposes discussing the method of operation which for him has been most successful.

One operation which we are frequently called upon to do is scrotal hernia in the stallion. The operation most commonly recommended is as follows:

Operation.—The patient is restrained in dorsal recumbency with a casting harness. Before casting, the harness is placed on the animal and then a sufficient amount of chloral hydrate is administered intravenously to produce general anesthesia. When down, the legs are tied and well abducted. It is advantageous to have the hind quarters at a higher level than the fore part of the body.

The operative equipment required consists of castrating instruments, a large curved needle, heavy silk sutures or 14-day chromic catgut, a long probe-pointed bistoury, a small trocar or heavy hypodermic needle, hemostats, and scissors. Strict asepsis is required throughout and necessitates a thorough scrubbing of the operative area with soap and water, the application of a 1 to 500 mercuric chloride solution, drying, and a final application of tincture of iodine. The feet, legs, and abdomen are covered with sterile sheets and the operator wears rubber gloves.

An incision six inches long is made in the

Presented before the Section on Surgery and Obstetrics, seventy-ninth annual meeting of the American Veterinary Medical Association, Chicago, Aug. 24-27, 1942.

(*Continued from preceding page*)

and this effect may not be desired in most instances.

The induced production of estrus, however, may explain the beneficial action of the drug in loosening the placenta, clearing of decayed tissue and fetid odor, and the early return of the uterus to normal condition, as in normal estrus there is an increased blood supply to the uterus, increased uterine contractions, and sloughing of old epithelium and its replacement with new epithelium.

most dependent portion of the scrotum on the hernia side, parallel to the median raphe and through the outer integument only. The tunica vaginalis is temporarily left intact, but separated from its external attachments by blunt dissection down to the internal inguinal ring. When the sac and its contents are thus exposed, it appears somewhat pear shaped and should be examined for large blood vessels which are sometimes observed in cases that become thickened by inflammatory reactions. If such vessels exist, they are ligated. Next, reduce the hernia by gravity, pressure and manipulation. The sac may then be incised and explored to make sure that all of the hernial content has been returned to the abdomen. The testicular cord is then emasculated well above the epididymis. On those occasions, when strangulation of the prolapsed gut has occurred, it may be necessary to enlarge the hernial aperture in order to return the viscera. This may be accomplished with a probe-pointed bistoury and should be done on the anterior aspect of the ring. Puncturing the bowel with a small trocar may also facilitate their return, if they are distended with gas and fluid.

It is at this stage of the procedure that I deviate from the former method mentioned. Instead of ligating the tunic and the cord close to the ring, I have opened the tunic and removed the testicle and then gauze, rolled into a knot, is placed into the hernial orifice. It is gently forced just through the opening to the abdominal side, the remaining portion of the gauze being allowed to extend down into the canal to act as a pack. The external wound is sutured. In from twenty-four to thirty-six hours, the pack is removed, which is easily accomplished, until the knotted part imprisoned within the ring is reached, when a little more traction will be required. It should not be jerked, but pulled steadily and gently until released. The surgical interference and the presence of the pack in the region for this length of time have created enough inflammatory reaction and swelling to prevent any further prolapse, and healing proceeds without undesirable sequels. It possesses an advantage over the older method, in that it can be accomplished quickly, is less likely to recur, and there is not a ligatured stump to slough and keep the wound contaminated with discharging material.

The kind of gauze used in packing is put up in rolls of five yards by one yard.

Bibliography

Operative Surgery—Fleming, 2nd Vol. p. 375.
Veterinary Surgical Operations—Merillat, p. 360.

Pregnancy Disease of Ewes

The nervous catastrophe named pregnancy disease of ewes is an acetonemia of strictly dietary origin. Normally, the blood-sugar level of sheep borders on insufficiency and besides, the power of sheep to draw upon their fat for energy is less than in other animals. Whereas, man's blood carries a blood-sugar level of 80 to 90 mg./100 and the chicken up to 200 mg./100, sheep's blood contains but 50 mg./100 or less.[1] When the pregnant ewe's blood-sugar level drops toward 20 mg./100, because of the demands of twins or triplets or from a low intake of carbohydrates, this tragic nervous up-set ensues. When the heavily pregnant ewe stops eating from any cause or is ill fed, the accumulation of acetoacetic acid of fat catabolism, which should be disposed of as fast as produced, is inevitable. In short, pregnancy disease is due to oxidization of fat faster than the body can get rid of the acetoacetic acid produced in the process of developing energy from fat. There is no cure for the affected animal. Corn and molasses are the best preventives.

Number of Carcasses Condemned for Arthritis and Other Bone Diseases

By the Federal Meat-Inspection Service

YEAR	NUMBER SLAUGHTERED	NUMBER CONDEMNED	PERCENT OF KILL
1919	44,398,389	39	.001
1929	47,162,573	5630	.012
1939	38,656,573	8314	.021
1940	46,673,925	8319	.018
1941	48,710,059	15143	.031

[1]Hughes, J. S. "Animal Nutrition," Proceedings Kansas Veterinary Medical Association, 1942, p. 13.

CLINICAL DATA

Enterogastrone—Gastric Sedative Hormone

That physiological equilibrium is maintained by the interaction of energizing and sedative hormones is well known in fact and in theory. The stomach secretes its own sedative hormone, enterogastrone, which Ivy and Greengard, of the Northwestern University Medical School, describe in the *American Weekly*. It is used in the treatment of gastric ulcer, the *sine qua non* of which is gastric rest. The newly isolated endocrine seems to explain why extract of hog's stomach is employed in ulcers of the human stomach and duodenum.

Coumarin

Coumarin, the active principle of spoiled, sweet clover which was isolated and synthesized by workers at the University of Wisconsin, is used for a variety of blood troubles in human medicine—thrombosis of the limbs and thrombophlebitis of expectant mothers. Bleeding caused by its use yields to vitamin K. Thus the coagulant, vitamin K, counteracts the anticoagulant, coumarin, suggesting the use of the former as the treatment of sweet clover toxemia.

Dicoumarin

Dicoumarin, anticoagulant, active principle of spoiled sweet clover, is the subject of the leading editorial in the Nov. 28, 1942, issue of the *Journal of the American Medical Association*. The work of Veterinarians Scofield and Roderick is cited. Besides having a reliable action, dicoumarin is not toxic for man.

The new Sulfanilamide-in-Oil is a "honey" for treating mastitis.—*P. R. Baird, Report Maine Veterinary Medical Association, Dec. 18, 1942.*

Ethylene Disulfonate: Asthma Cure

The section on the progress of medicine, *Science Digest* for December, 1942, announces "a new chemical remedy for asthma," discovered by Dr. Normal M. Smith, Minneapolis, after 18 years of research on asthma. Upward of 75 per cent of cures is the claim for the new remedy. Correcting the abnormal chemical state responsible for the allergy is the *modus operandi* of the drug. Some of the patients cured were unable to work or had almost died from asthmatic attacks.

Of this new therapeutic wizard and headline maker, the *Journal of the American Medical Association* says: "Here is another example of hasty and inadvised publicity based on scanty scientific evidence and questionable promotional practice."

Brewers' Yeast

Brewers' yeast of the proper sort contains 0.12 mg. of thiamin, 0.4 mg. of riboflavin, and 0.25 mg. of niacin. The normal daily requirement (human) is said to be 1.0 mg. of thiamin, 2.0 mg. of riboflavin, and 10.0 mg. of niacin. While the human and canine requirements are perhaps not the same, these figures will serve approximately as the basis for planning rations for dogs, and for the treatment of their suspected vitamin deficiencies.

Neilson and Madsen (*Poultry Science*, Nov. 1942) failed to produce perosis (slipped tendons) in turkeys by feeding a low manganese ration.

Vitamin C was first isolated in 1932. C. G. King, University of Pittsburgh, made the discovery and a year later made the synthetic vitamin C, now generally called ascorbic acid.

Red Squill (Raticide) Poisoning in Swine

The liver, lungs, and cervical glands from 1 of 4 dead hogs were brought to the animal pathology laboratory of West Virginia University, Feb. 13, 1942, for diagnosis. The lungs showed bronchopneumonia, the liver passive hyperemia, and the lymph glands active congestion and hemorrhages.

The organs examined were from a hog belonging to a state institution, and the feed was garbage supplemented with prepared hog feed.

The morning the 4 hogs were found dead, 7 other hogs were reported to be down, partially paralyzed—some showing labored breathing and cough, and some a slightly red discoloration of the skin.

The viscera from another of the 4 dead hogs was sent to State Department of Agriculture laboratories in Charleston for examination and chemical analysis for poison. The findings were bronchopneumonia, congested liver and considerable irritation and redness of the mucous membrane of the stomach and anterior portion of the small intestine. Poison was not found in the chemical analysis.

The 7 other hogs that showed symptoms all died within a period of approximately two days.

The cause of the condition and death of the 11 hogs was not determined at this time. There were about 700 hogs on the farm of this institution at the time, and no further trouble ensued until April 16.

On this date, 13 hogs were reported to be down and others affected in one of the feedlots, but not the lot in which the loss occurred in February. The symptoms described were similar, if not identical, to those shown by the hogs in February.

Upon arrival at the institution, about three hours following the telephone call, it was found that the number of "downers" had increased to 22. There were also a number of hogs showing depression and marked weakness of the posterior parts, staggering gait and wobbly movement of the hind legs and the hips. This weakness showed first in the posterior part of the body, progressed forward until it affected the entire body.

The prostrate hogs showed slow, weak pulse, dyspnoea, some cough, and slightly cyanotic skin. The temperatures ranged from subnormal to high normal. There was vomiting in the earlier stages and some diarrhea. Râles could be detected with the stethoscope in some of the lungs.

The autopsy on hogs that died naturally and those destroyed in a moribund condition showed bronchopneumonia, congested internal organs, particularly the mesentarium, redness of the mucous membranes of the stomach and intestines, especially marked in the anterior portion, and dilated heart muscles.

Before the investigation was completed, 35 hogs went down to complete paralysis and death. A few, only slightly affected animals made complete recovery.

From a thorough investigation concerning feed changes, and anything different from the usual, it was revealed that three days before the February trouble, red squill had been incorporated into hamburger and put about the basements of buildings for the destruction of rats. The quantity of the red squill put out at this time could not be ascertained. It was further brought out that 5 lb. of red squill was issued for mixing into red squill hamburger for rat poisoning three or four days before the April losses. This mixture was again supposed to have been distributed about the basements and garbage cachés of the various buildings.

Considering the symptoms, pathological lesions, and circumstantial evidence, it was concluded that the red squill hamburger, or a considerable portion of it, found its way into the garbage and was fed to the hogs.

The diagnosis—red squill poisoning—was made, accounting for the losses both in February and April.

Red squill[1] is supposed to be a fairly safe raticide. However, this is probably due to the fact that most domestic animals refuse

[1]Munch, J. G., Silver James, and Horn, E. E.: Red Squill Powders as Raticides. USDA Bul. 134, (1929).

to eat it. Garbage-fed hogs are used to eating mixtures not readily eaten by other domestic animals.

Veterinarians of the United States Bureau of Animal Industry and of the state veterinarian's office, Charleston, collaborated in the investigation.—*J. H. Rietz, D.V.M., and E. N. Moore, D.V.M., West Virginia University, Morgantown, W. Va.*

Animal Nutrition

Fifteen years ago, one engaged in the study of nutrition had little to impart on the practical application of knowledge on the health of livestock. Digestibility and energy values, and the relation between the energy of proteins and nonproteins were the bases for balancing rations. These were not directly related to disease. At the present time, nutrition deals with the action of feeds on the vital processes and the components essential to life. In these respects, the veterinarian should stand out as an authority in his community. Nutrition is chemistry, and feed is the art of supplying the chemicals the animal body needs.—*J. S. Hughes, professor of chemistry, Kansas State College: Proceedings Kansas State Veterinary Medical Association, 1942, pp. 12-20.*

A Method of Dosing Lambs with Phenothiazine

Britton, Miller, and Cameron of the University of California (*Cornell Veterinarian*, October, 1942) recommend the following plan of mass treatment of parasitized lambs with phenothiazine mixed in salt:

1) Mix 1 part of phenothiazine and 15 parts of half-ground salt on the basis of ½ ounce (15 Gm.) of phenothiazine per lamb per month. Thus 1,000 lambs would require 500 ounces (31.2 lb.) of phenothiazine and 468 pounds of half ground salt.

2) Enough of this mixture is put out to last the lambs 2 or 3 days and then the trough is refilled.

3) This is continued until the lambs have finished the mixture which is usually from 4 to 5 weeks.

4) After a rest period of 4 to 6 weeks the mixture is again prepared and set out as before.

5) Any lambs which do not appear to be taking mixture or look especially bad at the end of the 4 weeks period should be separated and kept on it in a separate pasture to insure that they get the drug.

6) In badly parasitized feeder lambs going on clover for the first time, it is advisable to drench with copper-nicotine before they are started on the mixture.

7) Phenothiazine has no effect on tapeworms hence the salt mixture alone cannot be relied on where tapeworms are considered to be a problem.

The lambs ate the salt-phenothiazine mixture readily through long periods of time and consumed from 9 to 10 Gm. of phenothiazine per head during each month, and at the end of the trials fecal examinations and autopsies showed that the infection had been eliminated.

Rotenone and Sulfur for Warbles

Alfred Fenton, director of agriculture, Texas Gulf Sulphur Company, Houston, writes:

"I wish to call your attention to the fact that the standard recommendation for the treatment of warbles at the present time is a mixture of rotenone and sulphur. Where a few animals are treated, the dust or wash application is both economical and efficient, but when treating large herds or cattle on the range, dipping and spraying is the quickest and easiest way to secure control of warbles."

Anasarca in Cattle

A disease, in some respects resembling vitamin A privation, reported as increasing in frequency by the federal meat-inspection service, was described by Jas. Farquharson, Colorado State College, before the annual meeting of the Kansas State Veterinary Medical Association, as a relatively new disease of feeder cattle. Anasarca, appearing at the base of the neck, elbow, and hock; blindness, falling down when excited, and the absence of any lymphatic involvement, suggested the diagnosis of avitaminosis A. In one incident, the affected animals had been fed "burned" alfalfa and yellow government corn that was three or four years old.

Bovine Brucellosis Vaccination

It would be unfortunate if veterinarians should yield to the temptation to practice promiscuous vaccination against bovine brucellosis (Bang's disease) instead of engaging in a nation-wide educational program as to its proper use. Certainly, no veterinarian is unaware of the sequels of adult vaccinating which render the vaccinated animal indistinguishable from the infected one. Moreover, vaccination not associated with classical herd sanitation will accomplish little toward ultimate eradication—the desired end in disease control. Where only the calves are vaccinated, the adults checked for the incidence of the natural infection among them, and sanitary measures of herd and premises properly supervised, "strain 19" should take its place among the big achievements of the American veterinary service. So, not to spoil matters to appease temporarily the too anxious client is the aim to be kept uppermost in mind in veterinary practice.

Opium Culture in the United States

War does strange things, but none could be stranger than the prospect of raising poppies for opium production in the United States, which has become a necessity owing to the closed channels of trade from the poppy-raising countries.

The proposal recalls the onetime extensive use of opiates in veterinary practice. What was a practitioner's medicine bag without its bottle of laudanum? And, how lock up those runaway bowels without it? The old veterinarians missed powdered opium and laudanum. It was pretty hard to convince them that stopping the diarrhea did not simultaneously cure the patient. It generally did. Morphine was of little use in horses and cattle and never came into general use until the era of small animal medicine, when that alkaloid was found to be a useful narcotic and preanesthetic in dogs which somehow respond to its calmative rather than to its delirifacient action. Of course, raising poppies in the back yard will not change the Harrison Narcotic Act, but it could make opium products cheap enough to bring them back into the veterinarian's arsenal to the advantage of the doctor and his animal patients. Oh, for the return of the day when you can drench a colicky horse with two ounces of laudanum and go home. A quart of linseed oil always took care of the lock up.

Cannabis: Marihuana

When the government, in 1934, imposed severe restrictions on the use and possession of cannabis indica and its American substitute, it removed a drug from the veterinary pharmacy which many regarded quite useful as a calmative, antispasmodic, hypnotic, analgesic, or whatever nervine action one may wish to attach to it. Opiates had gone out of use many years before. The Harrison Narcotic Act having made the price prohibitive and their use inconvenient, cannabis became the handiest succedaneum. But, with the Congress of '34, that too went into the limbo. Marihuana made criminals, lowered morals, and caused mental deterioration, and addiction, the law makers were told, not without strong evidence to that effect.

Now comes a controlled investigation[1] showing that the active principle—cannabidiol—has no deteriorating effect and does not cause addiction. Seventy-seven prison inmates were the voluntary "guinea pigs" used in the study. The investigators suggest the use of marihuana for certain states of mental depression and psychoneuroses in which desire for food is lacking, neither of which have any noticeable veterinary connection. The study, however, is a reminder that cannabis, injected intravenously into a colic case, put it to sleep and left no "hang-over."

[1]Editorial: J.A.M.A., *120*, (Dec. 5, 1942), pp. 1128-1129.

Workers at Washington State College report that beef short loins *do* contain some vitamin D, contrary to the general impression that beef is devoid of that nutritional factor.—*From Journal of Animal Science, November, 1942, p. 351.*

The Temperature Phenomenon Before Parturition and Its Clinical Importance

A phenomenon which has not been mentioned in English and American veterinary literature is the distinct fall in temperature in gravid animals a certain time before parturition. This fact can be used clinically in order to predict, to a high degree, the onset of parturition in most domestic animals, but especially so in the bitch where it can be utilized in determining the indication and time of operative measures. This temperature phenomenon is thought to be the result of an anaphylaxis incurred by metabolic products of the placenta.

For example, in the cow, the temperature differences were seen to be greater in the gravid animal than in the nongravid condition. Approximately four weeks before parturition, the temperature of the cow gradually increases to the physiological maximum (103.1 F.) and then falls rapidly about 1.6 degrees one day before parturition. The temperature reaches normal about 24 hours, postpartum. The sudden fall in temperature predicts birth within a day. This same reaction was also noted in the mare. The results are less reliable in primipara and very old dams. Temperatures should be taken two to three times a day.

Sheep, goats, and hogs exhibit a similar rise in temperature at the end of pregnancy. Does, especially young ones, may even exceed the physiological maximum (104.9 F.). The degree of change is very variable, depending on the days and at what hour taken. Sows then show a decrease about two days, antepartum; ewes show a slower decrease, but do not go below the physiological minimum; does exhibit a very distinct accelerated fall in temperature just a few hours before parturition. In ewes and sows, the limits are too narrow for clinical use, but in goats the temperature is a reliable sign.

The observance of the temperature is of excellent value as regards the bitch, but not as distinct as in the cat. One week before parturition the temperature begins to decrease, running between 99.5 and 101.3 F. The last three to four days before parturition, the temperature falls again to 98.6 - 99.5 F. until even a temperature below 98.6 F. may be reached. This lowest temperature is seen 10 to 18 hours before parturition. The onset of parturition in the bitch can therefore be expected with certainty within one day after the lowest temperature is taken. Since the normal temperature of healthy and non-digesting dogs is between 100.8 and 101.8 F., the drop in temperature is 2.2 - 3.2 degrees.

The recording of the temperature twice a day suffices to indicate the lowest level; it remains there until the animal begins to labor. Then, almost instantly, the temperature starts rising to normal and may even exceed it. Thus, these changes in temperature, being clearly perceptible, are reliable enough clinically to facilitate the decision as to when operative means should be employed. An absolute indication, therefore, for Caesarian section is present. When the subnormal temperature begins to rise and posterior pituitary extract gives no results, then operative measures must be resorted to. This occurs in atony of the uterus due to supernumerary or a single too large fetus.

Conclusion:—Cow and Mare—there is a decrease of about 1.6 degrees in the temperature twenty-four hours, antepartum.

Doe—there is a large decrease only a few hours, antepartum.

Sow—there is a distinct decrease two days, antepartum.

Sheep and Cat—too indistinct for practical purposes.

Dog—(*a*) the end of pregnancy is indicated by a subnormal temperature below 100.4 F.; (*b*) parturition can be expected within one day if the temperature falls to or below 98.6 F.; (*c*) a sudden rise in temperature indicates that parturition has begun. Cesarian section may be performed at this time with the least amount of risk to the bitch and her puppies; (*d*) the exact time of parturition may be ascertained even if the breeding date is not exact.—*Leo Weisz, D.V.M., Auburndale, Mass.*

[The author credits two Austrian and three German veterinary journals for information reported.—Ed.]

NUTRITION

The War Brings Problems in Nutrition

The appointment of a Special Committee on Nutrition was authorized by the Executive Board in December, 1941, pending final action on a proposed by-law amendment for the establishment of a standing committee on the subject. The proposed amendment to the Administrative By-Laws received favorable action by the House of Representatives at the 1942 annual meeting and, accordingly, President Dimock appointed a Standing Committee on Nutrition as given on page 299 of the October (1942) JOURNAL.

In carrying out its appointed tasks, one of the first actions of the new committee was to recommend to the Board of Governors (Committee on Journal) that a Section on Nutrition in the JOURNAL *be established, the material for which would be supplied by the Committee. The recommendation was approved and the introductory article is presented herewith.*

It is the purpose of these articles to furnish, from month to month, useful and timely information which should prove helpful to veterinarians confronted with nutritional problems in livestock and particularly at a time when wartime shortages of essential nutrients are becoming serious.

THE SLOGAN, "Food will win the war," is taking on added significance each day, for food is as important in war as tanks, planes and battleships. Everyone concerned with this aspect of the war is being asked to make an all-out offensive on the food production front.

In an effort to meet the quotas which have been set up for meat, milk, and egg production, greatly increased numbers of livestock and poultry are being fed. The feeding and caring for these under wartime conditions is creating many new problems. It is being found, for instance, that it is becoming more and more difficult to obtain some of the important ingredients which should be included in the rations of these animals. Wherever possible, substitutions are being made in these rations, some of which may not prove entirely satisfactory. The lack of one important ingredient from a ration or the substitution of a poor one may lead to slower growth, increased susceptibility to disease, or to definite symptoms of a deficiency. It is in the solution of some of these problems that the veterinarian must play a very important rôle.

SOME OF THE SHORTAGES AND SUBSTITUTIONS

High protein supplements of animal origin such as meat scraps, tankage, and fish meal are now difficult to obtain. Because of the quality of the protein supplied by these feeds, they are very essential in the rations of swine and poultry. This scarcity is leading to recommendations that these ingredients be used only in feeds for sows with pigs, young pigs for a few weeks after weaning, and for growing chickens. High protein supplement of vegetable origin, such as oil meals, are recommended for more mature swine and poultry. Where this is done, it becomes necessary to add to the rations the minerals and vitamins which would be supplied by the animal proteins. To make matters worse, it is now difficult to obtain these protein rich oil meals. At the time of writing, they are so scarce that some mills have ceased to offer dairy rations carrying 24 per cent protein and are considering the necessity of making other reductions of the protein content of the feeds which they are mixing.

In the vitamin field, we also find short-

ages developing. Milk, which has long been recognized as the most economical source of riboflavin for poultry, is being used more and more by our armies and our allies. This is making it necessary to turn to other products for this vitamin. While at present, there seems to be a fairly ample supply of fish-liver oils, our best source of vitamins A and D, everything possible is being done to encourage the use of substitutes for these oils. Irradiated animal sterols and irradiated yeast are assisting with the supply of vitamin D. Alfalfa leaf meal, which is a good source of riboflavin and carotene or provitamin A, is being recommended where either of these two vitamins is needed. Here again, for some reason, it is difficult to obtain sufficient quantities of high grade alfalfa meal in some sections of the country.

When we consider the supply of minerals, we find that bone meal, which is the best source of phosphorus for animal feeding, has also joined the list of scarce commodities. This will probably make necessary the increased use of phosfate rock as a source of this mineral. Fortunately, it is possible to remove the fluorine from this source of phosphorus in making it a safe product to feed. There is no question but that it is necessary to supply some other minerals in the form of supplements. At present, however, it is not difficult to obtain these minerals in one form or another.

This is a very incomplete survey of the scarcity of foods for farm animals, but it is enough to indicate that on this front as on all others, eternal care and vigilance must be the price of victory. It is possible that the conditions described do not apply to the country as a whole. However, it is true that as one product becomes scarce enough to make it necessary to use a substitute, the added demand for the substitute creates a shortage somewhere else. No one can predict the effects of all of these shortages on the animals, for it is difficult to say what may be lacking tomorrow.

We have to accept one fact, however. If we are to grow healthy animals, they must have adequate amounts of all of the food elements which are known to be essential for growth and reproduction. A deficiency of one or more of these food elements in the ration will lead to either complete or partial nutritional failure, with the animal becoming more susceptible to disease. This phase of animal production—the selection of foods which will keep the animals healthy—plays as important a part in our war effort as many actions in the front lines.

THE VETERINARIAN'S RESPONSIBILITY

Whether he stops to realize it or not, the veterinary practitioner is in the front line of this war sector. He is the man who is called in to care for the sick animals and to advise regarding those that are failing to gain in weight. He is daily in more or less close touch with those who are producing the meat, milk, and eggs. He makes contacts with feeders which the nutrition workers at the experiment stations cannot hope to make. It is his responsibility to be on the lookout for symptoms of nutritional failure and, if possible, to give recommendations which will help to correct the conditions.

It is the plan of the Committee on Nutrition to do everything possible to help the profession in this work. In the months that follow, various aspects of these problems will be presented in these columns. It is impossible for this Committee to anticipate all of the questions which may need to be answered if the profession is to carry its share of the load. They will accordingly appreciate receiving any and all questions and suggestions which will aid them in planning their work.

THE COMMITTEE ON NUTRITION

Cliff D. Carpenter M. L. Morris
George H. Hart Hubert Schmidt
H. J. Metzger, *Chairman, N. J. Agr. Exp. Station, New Brunswick, New Jersey*

Never having paid for executives trained by study and experience to manage the big emergency thrust upon the country, criticizing is out of order. Efficiency, in a big job like this one, can't be picked off the trees. Colonel-generals and field marshalls are not made over night, nor are master-minded civilian executives.

EDITORIAL

Rabbit Pathology: Neglected Science

AMONG THE RELIABLE sources of edible meat, the systematic raising of rabbits never has been entertained in the United States and Great Britain. Beef steaks, pork products, saddle of mutton and lamb chops, drumsticks and wishbones never have defaulted in these countries to the point of driving the housewife to raising the domestic rabbit (= *Lepus cuniculus*) in cages. The rabbit meat of the butcher shops is the product of Nimrod, not of the domestic warren. Yet, as of 1943, with war tearing down the instituted order, a hutch in the back yard, along with the chicken coop, ranges among the probabilities of the near future, as in Continental Europe where that scheme of food production is seen everywhere. *Lepus cuniculus* is a prolific breeder, a delightful companion, a source of delectable food, and its fur has some value.

However, rabbit production for the family cuisine has not been completely deserted. The far-seeing United States Live Stock Sanitary Association, guardian of the American larder, has had committees charged with the study of rabbit pathology, and in England, the raising of rabbits came into the foreground of the veterinary circle with the coming of World War II, like the raising of pigs and chickens in many a nook, when for a time, war threatened to reduce food supplies to a seriously low level. Until now, the rabbit as a food producer has been mainly of academic interest in the veterinary profession, its schools, its laboratories and its clinics.

"THE LITERATURE"

Les Principales Maladies de la Basse-Cour (Principal Diseases of the Barn Yard) by Prof. G. Moussu of Alfort, written in the teen decade, devotes one half of its 260 pages to the pathology of the domestic rabbit. In the French, Italian and German schools, poultry and rabbits are kept in the same category. Rabbit production is a part of the zoötechnics and pathology taught to students of veterinary medicine. This treatise is scientific and up-to-(its)date. Compared with such classical texts as *Hutyra and Marek's* of the same period, however, it shows the lack of

—*After G. Moussu*

Fig. 1—View of the Surface of the Liver of Rabbit Affected with Coccidiosis.

accord among distinguished authors on the nature of some of the main diseases of the domestic rabbit.

Rabbit and Cat Diseases (1919) by Charles G. Saunders, B.V.Sc., formerly professor of canine medicine, Ontario Veterinary College, was written in England and published in the United States. Sixty-

two of its 120, 5½" x 3½" pages in 12-point type, are given over to rabbit diseases. This rodent-carnivore espousal is a confession of the literary famine concerning both of these domestic animals. Diseases pronounced important, here and abroad, are omitted and discord prevails.

The Rabbit Book (1920) by F. L. Washburn, professor of zoölogy, University of Minnesota, one of the best books in sight on rabbit breeds of the fur-bearing kind, has 19 pages on diseases and treatment, which leave out maladies set down as extremely important by contemporary authors.

Diseases of Rabbits by R. F. Gordon, M.R.C.V.S., is an 11-page article in the August-September issue of the *Veterinary Journal*, London. This article, briefly, brings rabbit pathology down to date, as seen in Great Britain.

Pathology and Therapeutics of Domestic Animals by Hutyra and Marek, 2nd American Edition, although dealing at length on several rabbit infections, does not include *vent disease* among the spirochetoses of mammals. Yet, according to other authors, it ranks near the top of serious maladies of both domestic and wild rabbits.

This list of references, though incomplete, seems sufficient to reflect the amount of interest rabbit pathology has aroused. Booklets on special breeds of fur-bearing animals can be obtained from book publishers. As usual, such books add nothing to the field of pathology.

Should the disease problems of the domestic hutch suddenly become as important in this country as they have in Europe, the literature will be found to be limited, and experts in the science and art of rabbit medicine rare. A glance through the literature at hand reveals that but 12 diseases have been described and only four or five of the following are regarded as serious:

1) Coccidiosis—intestinal, hepatic, nasal(?).

2) Contagious coryza (snuffles).

3) Mucoid enteritis (lambliosis, Mousu; bloat).

4) Spirochetosis (rabbit syphilis, vent disease).

5) Pasteurellosis (hemorrhagic septicemia).

6) Tuberculosis—bovine, avian, human types.

7) Schmorl's disease (facial pyogenesis).

8) Cenurosus (bladder-worm disease).

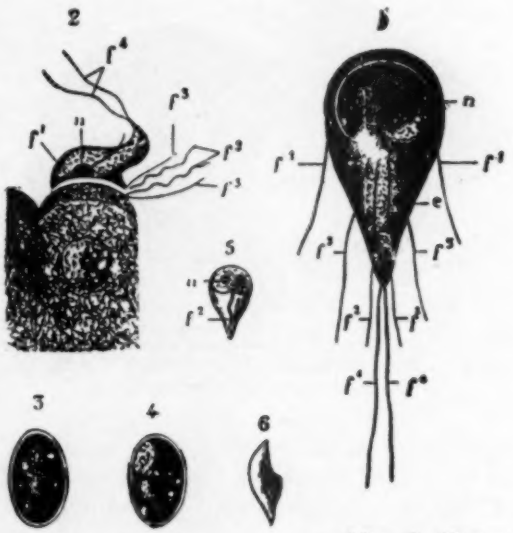
9) Strongylosis—gastric, intestinal.

10) Otacariasis (ear-mite mange).

11) Pseudotuberculosis.

12) Surgical diseases (hernia, wounds).

Intestinal and hepatic coccidiosis—pot belly disease.—On the basis of mortality and incidence, this disease ranks first.



—*After G. Mousu*

Fig. 2—Lamblia Intestinalis, specific agent of Mucoid Enteritis.

1, Ventral view. 2, Parasite fixed upon an epithelial cell. 3, Cyst from the large intestine. 4, Side view of an encysted parasite. 5, Parasite isolated in feces. 6, Side view of the same parasite. n, Nucleus. e, Ectoplasm. f, Flagellum.

Young rabbits of 2 to 3 months — lively, gay, growing — become anemic, emaciated, pot bellied, diarrheaic and die in convulsions, one after the other at irregular intervals, often destroying the entire litter in several weeks. The specific agent is *Eimeria stiedae* (also named *Coccidium oviforme, Coccidium perforans, Eimeria cuniculi* by different authors), a protozoan parasite of true coccidial behavior, which swarms in the liver (fig. 1)—cells and ducts—whence rejected into the intestine, out of the body with feces and onto the

gardens with manure to complete the life cycle and be reingested by new hosts. The disease is obedient only to sanitary measures based on this life history. Otherwise, it retains the terrors of lethal infections striking gregarious animals.

Contagious coryza, or so-called snuffles.—Placing this infection of the upper air passages among the coccidioses lacks scientific sanction. Hutyra and Marek describe snuffles under hemorrhagic septicemia. Although this upper respiratory infection,

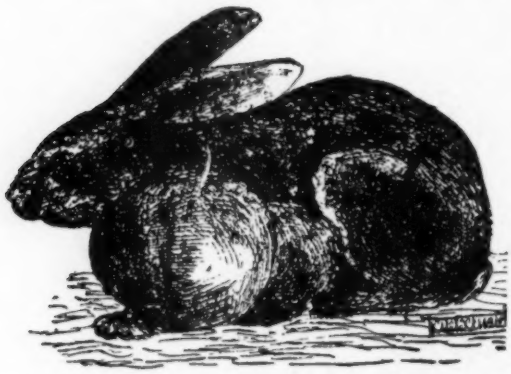


Fig. 3—Subcutaneous, Interstitial Cenurosis (Bladder-Worm Cyst) in the region of the shoulder. Cause: The Double-Headed Bladder Worm.

which is generally semichronic, no doubt coexists with coccidiosis, there is no proof of its identity as such. In contagious coryza, says Moussu, the presence of the parasite may not be demonstrable and he adds that it is better to consider snuffles a coccidiosis only when the autopsy reveals the usual intestinal and hepatic involvement and the parasite.

The German authors regard snuffles as an influenza and name *Bacterium bronchosepticus* and *Pasteurella leptisepticum* as present among the secondary agents. Gordon[1] questions the rôle attributed to Coccidium in snuffles. Hurt[2] describes the disease of southern California under *infectious colds* which he classifies under the three most serious diseases of rabbits. In short, the authors (Moussu, Saunders, Gordon, Hurt, Washburn, and Hutyra and Marek) are not in agreement as to the nature of this malady.

The course tends to be chronic. Its clinical expression is the continuous nasal discharge which obstructs the nostrils and encrusts their surroundings. The sneezing (from which the ailment gets its name) and rubbing the nose on the paws, matting up the fur by spreading the purulent nasal issue about the body, gives the sick rabbit an ugly appearance. Occasionally, the course is acute, ending fatally in a few days. Snuffles is often mistaken for a common cold (Gordan[1]).

There is no medical treatment of value except in cases not yet gravely stricken. Antiseptic inhalants and guaiacol products are named as convenient remedies. Rigid disinfection, prompt isolation of the sick and the quarantine of new arrivals are stated sanitary measures. In one instance, sulfathiasole has given important results in so far as modifying the acute symptoms (Hurt[2]).

Mucoid enteritis—intestinal lambliosis—infectious bloat.—This malady is one of the three serious rabbit diseases in southern California (Hurt[2]). Moussu in France and Perroncito in Italy, call it *intestinal lambliosis* and describe the specific agent (fig. 2) as *Lamblia intestinalis* (Lambl, 1859), also called *Cercomonas intestinalis.*

The main clinical manifestation is complete gastric and intestinal stasis and bloating. The stomach is full, the intestine empty. The arrest of alimentary movement is sudden. Scrapings from the intestinal mucous membrane contain the specific agent and numerous *lamblien* cysts occur in the contents of the rectum. Rapid multiplication of these cysts accounts for the spread and the many deaths the disease causes. The course varies from a few hours to several days. Because the stomach and bowels are locked, medication *per os* would be futile. Moussu mentions ipecac mixed and fed with bran as a preventive.

Mucoid enteritis, or lambliosis, may be set apart to show further the lack of accord among rabbit pathologists. Reports vary

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[1]Gordon, R. E., B.Sc., M.R.C.V.S.: Diseases of the Rabbit. The Veterinary Journal, *98*, (Aug.-Sept. 1942): 152-163.

[2]Hurt, L. M., B.S., D.V.M.: Miscellaneous Services—Rabbits. Report Los Angeles County Live Stock Department, 1940-1941: 58-59.

widely. Hurt,[2] in pointing out the disease as among the gravest maladies of rabbit production, states that it is "considered to belong in the category of nutritional disorders." Moussu, on the contrary, agrees with Perroncito that the cause is parasitic and describes the specific protozoan agent (fig. 3). Saunders, Washburn, and Gordon[1] do not include the disease in texts presumably intended to include the major rabbit maladies. It would be interesting to determine the relation of this infection to enteritis of children due to *Giardia lamblia* which yields to atabrine dihydrochloride, and *Balantidium coli* infection of man and of hogs.

Vent Disease, or rabbit syphilis is a spirochetosis, signalized as such by various authorities, but, as stated above, Hutyra and Marek do not include it among the spirochetoses of domestic mammals. The specific agent is *Treponema cuniculi*, a close relation morphologically to *Treponema pallida* of human syphilis. The two are, however, not interchangeable. The main etiological factor is the free mating of rabbits and the constant presence of the spirochete in the ulcerous lesions. The disease is species specific. No other rodent is known to be affected. Owing to its resemblance to human syphilis, a voluminous literature on the organism is available. Clinically, it differs from syphilis of man in several respects. The period of incubation is longer (60 to 120 days), speed of generalization is slower, the course leads to certain death in a year to eighteen months, and the ulcerous sores lack the induration of the human chancre. The diagnosis is confirmed by isolating the spirochete in scrapings from the lesions. Like *T. palluda*, the organism stains by Giemsa's method, or by fuchsin. Owing, however, to the history of the outbreak, clinical diagnosis is generally sufficient. Loss of flesh in spite of a fair appetite, anemia and cachexia are symptoms. Its syphilitic nature is shown also in responding to the arsenicals used in man (Moussu). Hurt[2] successfully treated over 1,000 cases with a mercurial ointment.

Taeniasis.—Two species of Ctenoteia infect rabbits but their larval history appears to be unknown. The larval forms of the tapeworm *Cysticercus pisiformis* (=single headed bladder worm) and *Coenurus serialis* (=double headed bladder worm) of dogs are cyst-forming parasites in rabbits. The former occurs as rather harmless blebs scattered over the peritoneal cavity, whereas, the latter causes bladders, some of them large, in intramuscular and subcutaneous connective tissue (fig. 3). The infection is contracted by eating grasses contaminated by the droppings of dogs. Prophylactic measures are self-evident.

Three blood-sucking species of Strongylus are described as having all of the potentiality of the gastric and intestinal strongyles of ruminants. The old anthelmintics recommended will probably be replaced by phenothiazine. Tuberculosis, hemorrhagic septicemia, Smorl's disease, (a fatal, pyogenic, facial dermatitis), otacariasis, ringworm, dietary deficiencies and other ailments added to the foregoing short list make up a schedule of this half explored field which, needless to assert, is an excellent source of food and fur upon which veterinarians will appreciate information.

The object of this brief is but to draw attention to a subject of growing importance in which there is lack of accord.

Just Lift the Price of Fluid Milk

Farmers are getting more money for milk sold to manufacturers of milk powder than for the fluid milk they sell for home use as such. Reason: the high cost of producing and delivering sanitary fluid milk—the most explosive of political problems. Nonpolitical-minded *Journal of Milk Technology* would set everything in order (quoting) "with guts and vision. . . . A food administrator is needed who has perspective." We'll say he'll need all that, including the chloroforming of the population while the prices are being lifted.

Says the Sixth Service Command: "Goebbel's propaganda is a potent weapon," to which could be added "Because Barnum was right."

A Much Needed Educational Program

The decision of the Associated Serum Producers to continue their educational program, which was made at their meeting in Chicago last December, is timely—timely for the farmers and for the doctors of their animals. Their educational campaigns waged by press and radio in recent years have improved livestock sanitation in a large way by making farmers more disease-conscious, which has resulted in their consulting more systematically with their veterinarians on problems of prevention, hygiene, and scientific methods of treatment. As of 1943, this strategem on the part of the serum producers dove-tails precisely with the food-for-freedom program launched *ex necessitate rei* by the government. As a matter of fact, cultivating a more general understanding of sanitation, hygiene, and disease prevention through obedience to the doctrines of scientific medicine belongs in the upper frame of the wartime effort. It would have been unfortunate and out of reason to have discontinued this educational campaign — unfortunate for the country, the farmers and for the veterinary profession.

Instead of curtailing their program of education, an even broader campaign will be conducted during 1943. As in the past, the work will be carried out by the American Foundation of Animal Health whose functions are underwritten by the Associated Serum Producers, comprising:

Allied Laboratories, Inc.
Blue Cross Serum Company.
Corn Belt Serum Company, Inc.
Fort Dodge Laboratories, Inc.
Grain Belt Supply Company.
Jensen-Salsbery Laboratories, Inc.
Liberty Laboratories.
Missouri Valley Serum Company.
Norden Laboratories.
Pitman-Moore Company.
Platte Valley Serum Company.
Sioux Falls Serum Company.
The Columbus Serum Company.
The Corn States Serum Company.
The Gregory Laboratory.
The National Laboratories Corporation.
The Royal Serum Company.
The Southwestern Serum Company.
The United Serum Company.

The expanded education of livestock owners will be accomplished through the intermediary of 1,200 newspapers, 18 leading farm magazines, and dozens of radio stations. Six million or more readers and listeners will be reached monthly during the year in conjunction with a continuous flow of messages and releases on timely livestock health subjects.

In addition, there will be issued a series of cartoons for use by county newspapers which will feature the rôle of the veterinarian in the war effort and the part he plays in helping to safeguard food production on the farm front. There will also be a series of feature articles dealing with individual livestock diseases in which the importance of professional service will be pointed out. As to the value of these campaigns, computed in terms of food poundage for the people and dollar profits for the farmers, no one is as qualified to testify as the veterinarian himself—the expert witness of the tragedies which the Associated Serum Producers are trying to prevent.

The Democracy of Human and Veterinary Medicine

Speaking before a Senate committee investigating the distribution of medical service under the present emergency, Editor Morris Fishbein, of the American Medical Association, had the occasion to remark that he represented a strictly democratic society which, needless to add, represents a large proportion of the nation's medical men.

Since the pattern of administration and operation adopted by the AVMA in 1933 is comparable, there is much for us to be thankful for. The Association is called upon to join in the battle for liberty and freedom raging in all parts of the world. Instead of the AVMA being a loose assemblage of well-meaning men, as of old, the power of united effort is now operating to the country's advantage far beyond former expectations. The normally limited manpower of the veterinary profession, without the solidarity of effort afforded by the present set-up, would have left veterinary science outside of the big picture, and

unknown. Veterinary officers and their enlisted personnel are guarding against unwholesome food for American soldiers in many exotic regions where such guardianship is extremely important to the health of our armies in field and station. The address of Col. E. M. Curley, V.C., U.S.A., chief veterinarian of the American forces in the European theater of operations, before the National Veterinary Medical Association of Great Britain and Ireland (*Veterinary Record*, Oct. 24, 1942), indicated the far-flung ramifications of American veterinary science in our country's struggle for existence. When the Surgeon General's postwar report has been written and the part played by veterinarians is told, the place of veterinary science in the foundation of society will be more secure and better understood, inasmuch as the orderly organization of the civilian service in food production will not be separated from the purely military achievements. Before food can be approved as fit, it must first be produced on the farms where the civilian service, which the AVMA helps to supervise, is laboring, also.

But, much remains to be done in AVMA councils to hold the ground gained. Additional reforms in the details of its organization must be instituted as time elapses and experience multiplies; such, for example, as the nomination of resident state secretaries by the constituent associations in the spirit of democracy and home rule, and the growing interest of the state associations in the House of Representatives and of the scattered personnel in the Executive Board and its Board of Governors, in the election of whom all share alike. If there is anything objectionable to remove or improvements to make, the power rests with the doctors of veterinary medicine and none else.

But, it can hardly be too often repeated during these days of war, of tears, of sweat, and in the days of social readjustment to follow, that the AVMA should be a society of 12,000 to 13,000 workers instead of 7,500. In the *Song of Hiawatha*, "All your strength is in your union."

Section on Nutrition

In this issue Chairman Herbert J. Metzger of the Committee on Nutrition writes the preface of a new section in the JOURNAL, named "Nutrition." Coming at a moment when the Advisory Committee on Scientific Publications, National Research Council, is supervising the scientific articles presented for publication in periodicals in order to curtail as much as possible the use of space not related to the war effort, this expansion is as timely as it is understandable. Nothing is more directly related to the war effort than the feeding of the domestic animals—the source of abundance in food supply.

That the new section will crowd out other material is expected but inasmuch as the Government is frowning upon the publication of material having no bearing upon national defense, the publication of material of that type will have to be postponed for the present to make room for the development of wartime needs.

Needless to state that the section on nutrition will aim to keep the readers of the JOURNAL informed on the ways and means of increasing the poundage of food through closer attention to that rapidly developing science.

Whereupon a Certain Bureau Was Born

Back in the 1870's, what with contagious pleuropneumonia, hog cholera, Texas fever, to name but three, the U. S. A. was dramatizing the plagues of Egypt with considerable commotion like certain of the more backward countries of Europe. France, Italy and Prussia had animal disease pretty well in hand but were menaced by the Balkans and Low Countries. Historians speak of guards posted along international boundaries 200 yards apart to prevent farm animals from crossing over. Contagious bovine pleuropneumonia and sheep pox were deadly plagues, and rinderpest was a constant threat. Not being fatal, foot-and-mouth disease was then less perturbing in the food-producing programs than these killing plagues of cattle and sheep. The first centennial anniversary of veterinary colleges had just been celebrated in Europe. For the United States, let us quote from an article by James Law of Cornell published in the *National Live Stock Journal*, January, 1880:

> Again and again in these columns we have set forth the need of *national interference* to extirpate* foreign plagues. . . . If the national government cannot take the matter in hand, and impose an unalterable quarantine of 90 days on all imports of cattle from Europe, then New York, Pennsylvania, and New Jersey may wisely abolish their cattle-disease commissions and turn their attention to something more promising; for, an infection of the West which under the present system, must occur sooner or later, will more than undo all they (cattle commissions) can accomplish and permanently blight the agriculture of the nation.

Hog cholera, bovine pleuropneumonia, anthrax, blackleg, Texas fever, glanders, scabies, sheep pox, tuberculosis, rabies, milk sickness, lung worms and other parasites were among the diseases of farm animals singled out by Dr. Law as the causes for great alarm. The article is accompanied with a map showing the spread of cattle plague westward from New England and Long Island through New York, Pennsylvania, New Jersey, Delaware, Maryland and West Virginia. The inconsistency stressed by the author was the futility of maintaining state-controlled quarantines at eastern seaports while western stock dealers were free to land imported farm animals by the thousands at the same ports for shipment to the Middlewest where they would establish far-flung centers of infection which would (and did) reinfect the East through the back door. Summed up, the animal-disease situation of the 1870's was a major American tragedy—a checkmate to the country's development which none but a few well-informed veterinarians seemed to understand. A population of 130 million could not have found food and shelter in the United States had animal diseases not been mastered. Law's foresight about the unmade West spells *savoir faire*.

Three and a half years after this article (*loc. supra*) was published, the Congress established the Bureau of Animal Industry, United States Department of Agriculture, and one of Dr. Law's students—Dr. D. E. Salmon—was chosen as its first chief. Congressman Hatch of Missouri, whose constituents knew by experience what Dr. Law was talking about, was the successful advocate of this step.

Why the new bureau was not named the "veterinary" or "animal health" department in view of the actual reason for founding it, is self-evident. The veterinary profession was but a swaddling brat lacking the prestige of animal industry which Congressman Hatch had to evoke in behalf of his project. In 1942, or 68 years later, a newly born bureau of that type would, no doubt, be baptised with "veterinary" somewhere in its name. The one who covered up his v e t e r i n a r y connection (though still with us) was more numerous ir 1880 than in 1942. "Veterinary" was not a decoration for either person or thing. It had donned respectable raiment only a century before in Europe and was yet to win recognition among our home—and gold seeking pioneers.

*"Eradicate" in that sense had not been coined.

Supreme Court Upholds Conviction of Medical Associations

On January 18, 1943, the United States Supreme Court rendered an opinion upholding the conviction of the American Medical Association and the District of Columbia Medical Society for violation of the Sherman Anti-trust Act.

According to an Associated Press dispatch under the above date in various newspapers, the 6-0 opinion was delivered by Justice Owen J. Roberts. Justices Frank Murphy and Robert H. Jackson did not participate because they had been associated with the justice department while the case was pending. The dispatch goes on to state:

The court upheld the judgment of the federal district court of the District of Columbia, as affirmed by the Court of Appeals, that the A. M. A. and the District of Columbia Medical Society had violated the Sherman Act by obstructing operations of Group Health Association, Inc., a nonprofit corporation organized by government employes to provide medical care and hospitalization. The Group Health Association employed physicians on a full time salary basis.

RESTRAINT OF DOCTORS CHARGED

The A. M. A. and the District of Columbia Medical Society were found guilty of conspiring to prevent members of the medical organizations from accepting employment under the group program and to restrain hospitals in the Washington, D. C., area from affording medical facilities to patients of group health physicians.

Fines of $2,500 and $1,500, respectively were imposed upon the A. M. A. and the District Medical Society after a jury trial here which cleared 19 individual doctors. The trial judge, James M. Proctor, dismissed similar charges against the Harris County (Texas) Medical Society, the Washington, D. C., Academy of Surgery, and two other doctors, all of whom were named in the original indictment.

The Supreme Court decision skirted the long standing question of whether the practice of medicine constitutes a trade within the meaning of the Sherman Act. It held, however, that the Group Health Association was engaged in business or trade, and "the fact that it is coöperative, and procures service and facilities on behalf of its members only, does not remove its activities from the sphere of business."

CALLING HELD IMMATERIAL

"As the Court of Appeals properly remarked, the calling or occupation of the individual physicians charged as defendants is immaterial if the purpose and effect of their conspiracy was such obstruction and restraint of the business of Group Health," the opinion said.

"The petitioners (the A. M. A. and the district society) did not represent present or prospective employes. Their purpose was to prevent any one from taking employment under Group Health. They were interested in the terms and conditions of employment only in the sense that they desired wholly to prevent Group Health from functioning by having any employes.

"Their objection was to its method of doing business. Obviously, there was no dispute between Group Health and the doctors it employed or might employ in which petitioners were either directly or indirectly interested."

The two organizations were accused of violating a section of the 1890 Sherman Act which prohibited conspiracies "in restraint of trade or commerce" in the District of Columbia.

Counsel for the organizations contended that "the practice of medicine and the rendering of medical services as described in the indictment" did not constitute "trade" and hence no restraint of trade was proved.

Replying again to various inquiries as to the authorship of certain articles and squibs published in the Journal, the inquirers are advised that published material not identified in headlines or foot notes, or in the text material, is editorial.

Re Change in Style of References

Beginning with the February issue, the use of roman numbers in references will be discontinued, material already set up excepted. In a few months, the use of roman numbers except in the backbone of the cover and mast head of the Journal will have disappeared. The change was made through the recommendations from various sources.

In the future, the six-point footnotes will read:

> Doe, J. H., and Jones, J. L.: Some Diseases of the Lungs. Am. J. of Path., *76*, (Nov. 1936): *45-51*.

The volume, which in this example is *76*, will be printed in arabic italics, instead of the former lower case romans, *e.g.* lxxvi. Only references containing the title of the material cited will be published. Please comply.

Some congressmen engage in rivalry for position that make it hard for soldiers to win the war.

Can Horses and Mules Meet Emergency Needs?

All eyes, especially of folks over 50 are looking to horses and mules to fall in where rubber tires will leave off several months hence when rubber gets too scarce to fix the boy's slingshot. The old folks who got along remarkably well with buggies and sleighs, iron-tired wagons and bobsleds are naturally optimistic if not also delighted over the expected comeback and so is the now famous Horse and Mule Association of America which somehow kept afloat through many a discouraging year even as the equine population of the U. S. A. sank from 25,000,000 to a paltry 14,000,000. Imagine the Japs licking a nation of Dinsmore's. We quote from a recent release:—

Wayne Dinsmore, Secretary of the Horse and Mule Association of America, says that purchase of animals for short hauls and routine delivery work in cities, considerably talked of, is not likely to materialize until tires now on motor vehicles used in such work wear out, or trucks are commandeered; for it is typical of us as Americans to put things off until the last minute, then make a frantic rush for what is needed—wasting time, energy and money because of failure to prepare earlier.

The United States has approximately 14,000,000 head of horses and mules, of which about 12,000,000 can be put to work in harness or under saddle this spring. These 12,000,000 horses and mules—if wisely handled—can do as much work as 18,000,000 ordinarily did do in peace times. All that is needed is to spread farm work over more weeks, more days, more hours per day, and to so feed and train the work animals as to put them in hard, fit condition before spring work opens up, and keep them so throughout the work season. It can be done—farmers did it before tractors or trucks were heard of, and can do it again.

Most farm horses work without shoes, except those used on stony land, or driven on gravel or paved roads. Approximately 30,000 tons of iron or steel are needed to furnish the horseshoes and horseshoe nails needed for all the farm horses that wear shoes in a year,—less than is used in 20,000 tractors,—yet today some men in OPM are quibbling about allowing horse and mule users the modest amounts of iron and steel needed to keep all the farm horses and mules in America in harness and horseshoes, while asking for more than 6 times as much to make approximately 150,000 tractors.

Farmers will have to haul grain and livestock to the nearest railway station, load it, and let railways haul it. This will increase need for shod horses.

Railways and horses will take up our transportation, and handle it as they did prior to 1920. It will be well done, economically done, for railways will switch cars as close to consignee as possible, so that most destination hauls will be short hauls.

We did all this, from the time railways were built, until 1920; we can and will do it again to maintain our freedom.

But, wishful thinking can be as dangerous as the fifth column. The nation is not only running on a higher gear but practically everything horses need to stage the comeback is "out of print." There are no harness, nor buggies, nor wagons, nor trappings to equip them, nor anyone to make such things. Moverover, horses are dying off faster than they are being bred. It takes four years to make a replacement. By that time we hope to be dining in Tokio and Berlin, while the family is basking in the sunshine of Monte Carlo.

Veterinarians are also looking over the old gray mare, now more then 13 years old and the vanishing colt crop of the last few years, which only young mares could replenish. We're thinking also of horseshoes and shoers, of boys who can drive and care for horses, and of the farm hands required to produce the abundance expected to feed the world and ourselves. Veterinarians remember how they nearly "took the count" when motors came surging along and dislocated the very spine of their occupation but, being everywhere on scene of action they are not deceiving themselves about the anticipated return to a horse-drawn vehicles "for the duration." Being quite pragmatic, the veterinary profession would like to see more horse and mule farming because that is the economical kind but as a means of surmounting the obstacles of the moment, it sees but little hope. The readjustment in time is not possible.

Colchicine

COLCHICUM or meadow saffron (*Colchicum autumnale*) is an age-old treatment for gout and rheumatism which, in the form of its alkalod, colchicine, has come into prominence recently as a treatment for cancer and also as a stimulant of the cells of tissue cultures used in laboratory work. As a cure for gout, colchicum is described in the literature of the Arabian school—the connecting link between ancient and modern medicine.

In the pharmacopoieas handed down from the 19th century colchicum is described as an emetic, cathartic, cholagogue and gastrointestinal irritant that is but slowly eliminated. Owing to its retention, its toxic action was said to be accumulative. Like other drugs popular with the old physicians meadow saffron fell into disuse for want of a scientific background, if not also on account of its toxicity.

In his manual of pharmacology (fifth edition, 1936), which is generally regarded as authoritative, Sollmann[1] declares that colchicine has no effect on chronic rheumatism, pain or neuralgia. Opposed to Sollmann are the views of Dominici[2] and of Amoroso[3] who contend that it improves the health of patients affected with gout and cancer. Moreover, there is no longer any disagreement in regard to its profound action on the intracellular metabolism of tissue cultures. As expressed by Litz,[4] "colchicine explosively stimulates mitosis." Tennant and Liebow[5] demonstrated that colchicine in dilutions as high as 1:64,000,000 causes chromosomes to disperse through the cytoplasm and new nuclei to form in cells of tissue cultures of mouse-breast cancer. While that "homeopathic" dose may not be a criterion upon which to base its dynamics on the living body, there is reason to suspect that its stimulating action on the cells of tissue cultures may account for the curative properties claimed for colchicum through the centuries. A drug in such weak solutions that is capable of activating the metabolic changes in cells of normal and neoplastic tissues made dormant by removing them from the living body may have analogous action upon the cells of the sick and thus favorably affect the course of the diseases for which it was so long employed.

McKillip (M.H.) prescribed wine of colchicum for chronically lame horses and so did Bell (Roscoe R.), prominent Brooklyn practitioner of the 19th century. Whether the use of this age-old galenical should be revived in veterinary practice is, perhaps, of little importance, since its demonstrable intracellular action is no more easily fitted scientifically into the treatment of lameness than the speculative action claimed for it by the old pharmacologists. For, to be precise, colchicine stimulates intracellular metabolism only up to the metaphase, that is, up to the actual mitosis. At the point of actual division, the action stops. Otherwise stated, while colchicine has a tremendous activating effect upon the nuclei and cytoplasm, it really arrests mitosis at the point of cleavage. Cells in the process of division, but not divided, are piled up. The growth of cancer tissue is thus arrested. But, how this new knowledge fits into the treatment of gout or lame horses remains to be explained.

The use of colchicine in agriculture is also promising. Its explosive action on the chromosomes of plant cells has been demonstrated by the Canadian National Research Council. By doubling the number of chromosomes with colchicine, a sterile hybrid between wheat and wheat grasses, a new perennial forage crop, was developed.

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[1]Sollmann, T.: A Manual of Pharmacology, fifth edition, 1936, p. 542.

[2]Dominici, A.: Cited by Harshfield, Tennant and Ougherson. Yale J. Biol. & Med., xiii (Oct. 1940), pp. 51-59.

[3]Amoroso, E. C.: *Ibid.*

[4]Litz, F. J.: Cellular reactions and lesions caused by colchicine (title trans.). Arch. int. de Méd. exp., xi (1936), pp. 801-901. Cited in *Ibid.*

[5]Tennant, R., and Liebow, A. A.: The action of colchicine and ethyl-carbylamine on tissue cultures. Yale. J. Biol. & Med., xiii (Oct. 1940), pp. 39-49.

CURRENT LITERATURE

ABSTRACTS

Biopsy of the Testicle to Detect Sterility in the Male

To avoid long, drawn out treatment of incurable azoöspermia and aid in making a more accurate diagnosis, the author performs biopsies to study the testicular tissue and thus determine whether the cause of the trouble is in the gonad or elsewhere. There are gradations in the degeneration of the germinal epithelium. Complete degeneration defies treatment. If active, there is "a graveyard of the sperms" elsewhere than in the testicles, and more appropriate treatment can be applied when the trouble can be located. The biopsy offers much toward the use of the proper treatment, since testicles are labile structures sensitive to generalized alterations of vital functions or influenced by other glands of the endocrine system. While biopsies do not solve all problems associated with the absence of sperms, they do obviate some of the difficulties. They, at least, prevent the use of repeated injections of gonad-stimulating hormones when the testicles harbor numerous spermatozoa or are hopelessly atrophic. [*Robert S. Hotchkiss: "Testicular Biopsy in the Diagnosis and Treatment of Sterility in the Male." The Bulletin of the New York Academy of Medicine, Second Series, 18, (Sept. 1942), pp. 600-605.*]

Studies of Mycobacteria with the Electron Microscope

The science of optics dates beyond the Christian era but practical microscopy began with Leeuwenhoek in 1673. As time elapsed improvements were made. The optic microscope cannot reveal objects smaller than half a wave length of light, or 0.000,4 to 0.000,7 mm., and objects less than 0.000,2 mm. are indistinct or invisible—an obstacle to the study of many of the components of bacteria. Attempts to develop an electron microscope failed until 1940, when one magnifying 100,000 diameters was invented by Zworykin of the RCA laboratories.

Electronic microscopy has shown that the human tubercle bacillus varies in length from 0.8 to 5.5μ and in width from 0.2 to 0.6μ with numerous variations in size among cultures of different sources and in the same culture. Tubercle bacilli cultured at Columbia University varied from 4.3 x 0.4μ to 1.0 x 0.2μ. Although the presence of a capsule is generally questioned, the electron microscope apparently shows that a membrane is uniformly present. The nuclear masses are shown to vary in size and density and are generally found at the ends of the rod. When numerous, they are distributed with spaces between like beads.

Most of the bovine bacilli were short and plump, measuring 1.0μ long and 0.5μ wide, and a capsule was uniformly present. The nuclear material was arranged in granules throughout the long axis, although in some instances the cytoplasm was homogenous.

The avian bacillus averaged 1.0 x 0.3μ but larger ones were occasionally found, one measuring 6.0 x 0.7μ, and it also showed the presence of a membrane. The nuclear material was either arranged around the periphery or distributed throughout the long axis.

Other bacteria of the genus are described as to their dimensions, nuclear arrangement and cytoplasm. [*Milton B. Rosenblatt, Earnest F. Fullam and Albert E. Gessler: "Studies of Mycobacteria with the Electron Microscope." The American Review of Tuberculosis, 46, (Dec. 1942): 587-599.*]

Human Cases of Weil's Disease in the United States

Lack of interest in Weil's disease, failure to make a diagnosis, and neglect in reporting authentic cases accounts for the disparity between the incidence reported in Europe and Asia and in this country. Only 23 cases occurred in the United States from 1922 to 1940 as compared with 248 in Great Britain and 374 among the small population of Holland from 1924 to 1940. Investigation by laboratory methods and more thorough studies of the disease are recommended. When other studies fail to reveal the presence of Leptospira, the improved complement fixation and agglutination tests are helpful in addition to the clinical picture, history of exposure, and the occurrence of the disease in the region. Weil's disease should be a reportable infection.—*D. W. Kramer, M.D.: "Weil's Disease: Incidence, Diagnosis and Treatment." Pennsylvania Medical Journal, 45, (Oct. 1942); 1298. Abst. J.A.M.A. 120, (Dec. 12, 1942); 1254.*

Hydrocephalus, a Lethal in Cattle

Hydrocephalus has been reported as an inherited lethal in the human being and in various species of animals including chickens, rats, and rabbits; collection of fluid within the ventricles of the cerebrum—*internal hydrocephalus*—and collection of fluid outside of the encephalon. The author describes the condition in a herd of grade Holstein-Friesians in which no inbreeding had been practiced before 1938. There were no reasons to suspect nutritional

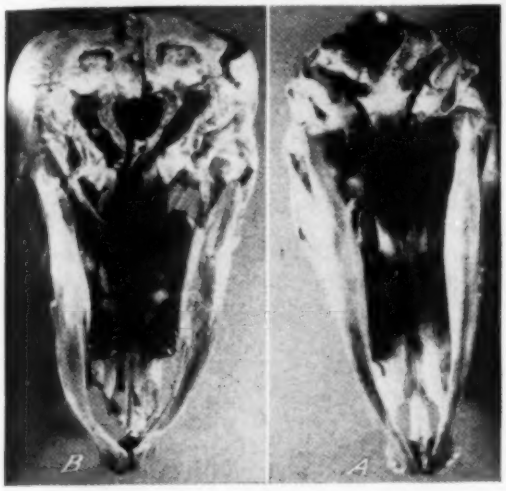

Fig. 1—Internal Hydrocephalus in calves showing abnormal position of the foramen magnum.

deficiency but in 1940, two heifers mated to their sires gave birth to abnormal calves comparable to a similar abnormality from the same cause the year before. In 27 calves from such matings (sire-daughter) involving 15 heifers, there resulted 6 lethals, 2 jumpy, 2 asymmetrical, and 17 normal calves. Dissection of the lethal revealed internal hydrocephalus distending the ventricles to the level of the skull bones without any apparent blockage of the foramens, save for the altered foramen magnum which may have blocked the foramens Magendie and Luschka and thus caused the accummulation of fluid, a secondary manifestation of a gene for skeletal abnormalities. The humeri and femurs showed marked alterations, along with the asymmetrical skulls. "Jumpy" is defined as lack of muscular coördination and control suggestive of cerebellar or thalmic dysfunction. The lethal trait, asymmetry, and jumpy are believed to be due to three recessive genes, according to a genetic analysis made. The three pairs of allels were:

L—Lethal .....l—lethal
A—Asymmetry .....a—asymmetry
J—Jumpy .....j—jumpy

The sires should have the genotype, LlAaJj, and the daughter would have eight different genotypes: (1) LLAAJJ, (2) LLAAJj, (3) LLAaJJ, (4) LlAaJj, (5) LlAAJJ, (6) LlAaJj, (7) LlAAJl and (8) LlAaJj. Back-crossed, these daughters would produce the following percentages in their offspring: (1) LAJ, 66,992; (2) LAj, 9,570; (3) LaJ, 9,570; (4) lAJ, 9,570; (5) lAj, 1,367; (6) laJ, 1,367; (7) Laj, 1,367; (8) laj, 0,195.

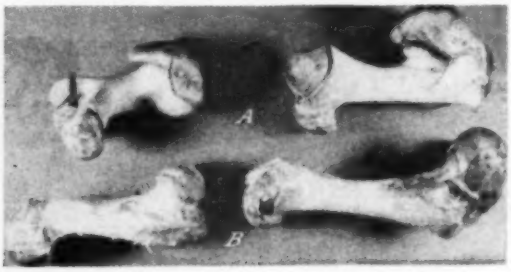

Fig. 2—Humeri and femurs of calves: A. Of calves affected with Internal Hydrocephalus; B. Of normal calves.

The expected and observed distribution of the 27 calves by phenotype would show that lAJ and lAj, and laJ and laj are combined. The data suggest that the sires carried three rare recessive genes, although the probability that any one animal would carry three rare factors is small. [*C. L. Cole and L. A. Moore: "Hydrocephalus, a Lethal in Cattle", Journal of Agricultural Research, 65, (Nov. 15, 1942), pp. 483-491.*]

Ascorbic Acid of the Blood in Dairy Cattle

That the synthesis of vitamin C is a property possessed by cattle is generally entertained, although the relationship among *ascorbic acid synthesis, metabolism,* and *reproduction,* emphasizes the importance of its concentration in blood plasma. Sterility of bulls and cows has been found to be associated with low ascorbic acid concentration in the blood. Slow breeding bulls and hard to settle cows respond to ascorbic acid therapy. Investigation of the blood plasma of 19 calves (age 3 weeks to 12 months), 4 heifers, and 24 cows, indicates that the amount of ascorbic acid differed so markedly in normal calves, heifers, and lactating cows, that random determinations on the concentrations of vitamin C in the blood plasma of dairy cattle are of little value. [*Bortree, A. L., Huffman, C.F., and Duncan W.C.: "Normal Variations in the Amount of Ascorbic Acid in the Blood of Dairy Cattle," Journal of Dairy Science, 25, (Nov. 1942), pp. 983-990.*]

Increasing Profits from Livestock

Proper housing and feeding, maintaining good health, and careful handling are named and described as the triumvirate of profitable livestock raising. To grow prime, healthy meat animals, they must be protected against excessive cold or heat and receive ample amounts of clean, wholesome feed. Health is maintained through sanitary surroundings and hygienic feeding, providing against contagious diseases by vaccinations, and avoiding exposure to filth, mudholes, stagnant water, decomposed feed. The local veterinarian is the best adviser in these respects, but he cannot perform miracles with the sick nor bring back the dead. It's after all a mathematical problem—adding to poundage by resort to proper methods of housing, feeding, care and handling. There is no profit in weak, sick or dead animals. Animals are vulnerable to injury in handling. Kindness is therefore a good investment, cruelty and neglect a great liability. Surveys made by the National Livestock Loss Prevention Board show that farmers could save over 12 million dollars a year by handling livestock more carefully, not to mention the suffering they might prevent. And, to be remembered, nations, like persons are poor or rich according to the wisdom shown in the care of their domestic animal. [*Young, W. A., D.V.M., managing director, The Anti-Cruelty Society, Chicago: "Increasing Profits from Live Stock," National Humane Review, 30, (Nov. 1942), pp. 21-24.*]

Eating Cheese Causes Outbreaks of Typhoid

Three epidemics of typhoid fever in southern Manitoba during the winter of 1939-1940, totaling 100 cases, were traced with considerable difficulty to eating typhoid-contaminated cheese. At first, the attending physicians, not having had recent experience with typhoid, mistook the disease for influenza. Painstaking investigation carried out by the provincial department of health revealed that all of the victims had eaten cheese which was eventually traced through various stores and lunch counters to a single cheese factory, receiving milk from 75 different farms. The task of investigating that number of places and many persons connected therewith led to the detection of two typhoid carriers. Eliminating these, pursuant to the stated regulation, stopped the epidemic, together with the enforcement of the ruling followed by the Army of forbidding the sale of cheese until it had aged for three months. Either the pasteurization of the milk or the aging of the cheese should be insisted upon, the author declares. [*Bowman, Maxwell, M.D., D.P.H.: "An Epidemic of Typhoid Fever due to Infected Cheese," Canadian Journal of Public Health, 33 (Nov. 1942), pp. 541-547.*]

Number of Daily Milkings Do Not Affect Persistency of Milk Production

Defining *persistency* as the amount (rate) of milk secreted as the period of lactation advances, the authors conclude, from a series of controlled experiments, that *persistency* measured by actual rate of decline (slope) is not affected by the frequency of milkings per day. Of interest to the dairyman and his veterinarian is the fact that cows may yield a high total per lactation without reaching a very high maximum. Between the third and ninth months of lactation the decline is consistent. [*Ludwin, I.: "The Effect of the Number of Daily Milkings upon Persistency of Milk Production," Journal of Dairy Science, 1 (Nov. 1942), pp. 300-308.*]

Community Auctions

Community auctions, born in North Dakota just a few years ago, have grown to a billion dollar industry. They suffered from growing pains, got into some mischief and are getting some parental spankings. In these days of curtailed transportation, they are the funnel of concentrated local trade and a ready market for livestock and portable merchandise. Though twenty years ago owners dealt mainly with unscrupulous scalpers, the well-managed community sale now offers better opportunities to farmers where the sales barns owners do not become a veritable haven for scalpers, rather than operate on a strictly commission basis. But, like all places where animals are congregated for sale, there is the hazard of spreading disease, and no system of inspection yet devised can entirely eliminate that. Owners who intentionally consign diseased animals to these sales should be prosecuted to the full extent of the law. These are not numerous. Sales barns owners can only sell animals as they are represented, and the buyer has the obligation of providing proper conditions required by newly purchased animals. No inspection is keen enough to detect carriers of disease showing no visible symptoms. No matter how well managed a sales barn may be, the danger of hogs contracting enteritis, scours, erysipelas, brucellosis, cholera and other infections from being transported in contaminated trucks, always exists. Trucks should be disinfected before loading, whether coming to or going from the sales barns. Dipping vats should be provided at sales barns for sheep, and also for hogs. Livestock sanitary officials, livestock marketing authorities, and sales operators should go into a huddle and draft model laws governing this plan of marketing livestock as sales barns are here to stay. [*A. H. Quin, Jensen-Salsbery Laboratories; "Going, Cheese," Canadian Journal of Public Health, 33, 1942); 15, 38, and 39.*]

Bovine Tuberculosis in Britain

Vital statistics of England and Wales in 1941 showed a considerable increase in tuberculosis mortality among children. About 30 per cent of all cases of nonpulmonary tuberculosis in Great Britain is caused by the bovine bacillus. At all ages it is responsible for about 6 per cent of deaths from all forms of tuberculosis, but this figure is much higher among infants and children than among adults.

It is generally believed that before the war about 40 per cent of the cattle in Great Britain reacted to the tuberculin test. H. T. Matthews pointed out at a discussion before the Royal Society of Medicine that there are districts where the incidence is nearly 100 per cent and others where it is correspondingly low, and he insisted that "the conception of a uniform 40 per cent incidence as a total bar to the application of American methods (slaughter, with compensation to the owners, of all reactors) is therefore misleading."

Opinion on the beneficial effects of BCG vaccination is still divided, and the immunizing properties of the recently discovered vole bacillus are still under experimental investigation. On the whole, little progress is likely to be made in the eradication of tuberculosis in cattle while the war continues.—*Editorial: "Bovine Tuberculosis," Brit. Med. J., Sept. 26, 1942, p. 371.*

Coccidioides Immitis in Man

The infection is contracted by inhalation, and the symptoms closely resemble those of influenza or bronchopneumonia: headache, anorexia, weakness, nausea, cough, chills, pleuritic pain, night sweats, and fever. In the second stage, there is erythema nodosum, conjunctivitis, and arthritis. The diagnosis is confirmed by finding the organisms in the sputum, agglutination tests, animal inoculation, leucocytosis, and eosinophilia. The roentgen findings are the same as in epituberculosis. The disease is easily confused with pulmonary tuberculosis or pneumonia. [*Powers, R. A. and Starks, D. J.: Acute Coccoidioidomycosis. Radiology, xxxvii (Oct. 1941), p. 448. Abst. American Review of Tuberculosis, Nov. 1942.*]

BOOK NOTICES

Veterinary Service in Wartime

Coming out in the midst of the greatest war of all time and dealing with many problems we are expected to face before and after the conflict is over, this book will be appreciated by active and potential veterinary officers and their civilian colleagues, by the service of food procurement, by the cavalry and animal transport, and by the livestock industry. The scope of this manual is a reminder that although America is fighting for its very existence, its debt to the domestic phylum and the men commissioned to guard it against the ravages of farm-animal disease remains to be comprehended. The antecedents of rationing, hunger, malnutrition, famine and their consequences, defeat, poverty, pestilence, social decline, are all contained between the lines of this small book.

The magnitude and ramifications of the army veterinary service, numerically small as it is, are told in the opening article and this is followed with a brief on biologic warfare—the malicious implantation of contagions among livestock by the organized "microbic arm" of the enemy.

The body of the book is occupied by the array of native and exotic diseases of food and transport animals with which the veterinarian of this hour is expected to court close acquaintance: surra of the Asiatics, American and African trypanosomiases, dourine, piroplasmoses, rinderpest, foot-and-mouth disease encephalomyelitis, infectious anemia (swamp fever), anthrax, respiratory infections, glanders and other animal plagues, which are described as to their geographic distribution, their nature, prevention and treatment. Experiences of an army veterinary general hospital in the simulated warfare of June, 1941 (Louisiana maneuvers) is a narrative of actual experience in veterinary military work in the field. The incidence of injury and disease and the plan of handling them in the field under the present regulations are described.

The treatment of wounds in army animals (which is quite a good testimonial on the merits of sulfanilamide), experiences of a veterinary pack train in Africa, air raid casualties among animals in England, chemical warfare up-to-date, and the meat-inspection schools for veterinary corps officers and men, contribute to the interest and completeness of this manual.

A chapter is lacking: "The rôle of the veterinary service in the social scheme" or "What does all this mean to the general population?" What a chance for an absorbing preface or epilogue! [*Veterinary Service in Wartime, copyrighted reprints from Veterinary Medicine. Cloth bound. Indexed. Illustrated. 112 pages. Veterinary Magazine Corporation, Chicago. 1942. Price $1.00.*]

Structure of the Cow's Udder

H. L. Foust, professor of anatomy, Veterinary Division, Iowa State College, has thoughtfully gathered, edited, and bound between covers, a series of articles by American anatomists (Emmerson, St. Clair, Venzke, Holm, Foust) which he names *The Structure of the Cow's Udder*. While every detail pertaining to the or-

ganization of the cows mamma may seem to have been told in the great volume of literature on that subject in every principal language, these articles prove that much remained to be described. The series chosen for this book is one of well-illustrated descriptions of painstaking dissections and microscopy which add new units to the sum of mammary anatomy—gross and microscopic. Since medical science is built upon knowledge of living structure, every new thread woven thereinto is a precious donation, and still more so, when the anatomic fabric strengthened thereby is as important to mankind as the mammary mechanism of the lowly cow—the source of a protective food indispensable to the security of this civilization. The process and structure concerned in bovine lactation is vital to human progress. Whereas, the cow is accorded the credit of being the foster mother of mankind, few ever stop to study *in toto* the complexities of the apparatus responsible for the mother's rating—the cow's udder. Yet, it is the vaguely known transcendentalism of this sort that is drawn upon in the food-for-freedom program. While war is raging such a book may seem remote from the war effort, notwithstanding its direct bearing upon war's greatest implement—amplitude of food. The arrival of this book just now reminds one of the stupidity of removing science from the shelves of the pantry.

The first 36 pages are the exhumed thesis of Mark A. Emmerson, University of Pennsylvania, written in 1928 in the quest of the degree of master of science at Iowa State College, wherein the author inserts 18 graphic, original pictures, mainly gross anatomy, illustrating the exterior and interior of the cow's udder. Compared with the usual schematic drawings depicting mammary circulation, this phase of Emmerson's thesis is arresting. The only counterpart, in this respect, is found in Bourdelle's famous regional anatomy of domestic animals, written during World War I as a contribution to the war effort of France when colleges but not scientists had stopped working in that now unfortunate country.

The second article titled "The Nerve Supply of the Bovine Mammary Gland" by L. E. St. Clair, a "Master's Thesis," Iowa State College, reprinted from the January, 1942 issue of the *American Journal of Veterinary Research*, has descriptive matter and illustrations which shed new light on mammary innervation, and, therefore, on the physiology of lactation.

Histological studies of the milk cistern and teat by Carl E. Venzke, Iowa State College, with its nine photomicrographs, also a reprint from the JOURNAL *(J.A.V.M.A.* Feb. 1940), treats of the skin of the teat, the streakcanal, milk cistern, glands and accessory glands of the milk cistern wall, and the milk-collecting system within the gland. The histology of the mammary gland itself is described and illustrated by Francis J. Kwong of the same department and college.

Glenn C. Holm, now at the University of Idaho, writes on "A Histological Study of Bovine Udder Parenchyma," a reprint of an article published in *Veterinary Medicine* in 1937. It contains eight photomicrographs.

The closing article entitled "The Surgical Anatomy of the Teat of Cows," by H. L. Foust, head of the Department of Anatomy, Veterinary Division, Iowa State College, a reprint from the section on Surgery and Obstetrics, of the JOURNAL in 1940, is obviously the most classical treatment of that phase of mammary anatomy ever published. Its text, including illustrations, were widely abstracted in scientific publications abroad. A color plate of a sagittal section of the teat, touched up to bring out the salient points (glands, muscle, blood and lymph vessels, nerves, epithelium), is a lesson on teat structure that should not escape careful study in dealing with the cow's teat and its numerous aberrations.

The anatomist, physiologist, pathologist, and clinician interested in bovine medicine will be delighted with this small but highly absorbing booklet. [*The Structure of the Cow's Udder, edited by H. L. Foust, head, Department of Anatomy, Veterinary Division, Iowa State College. Spiral bound. 70 pages. Profusely illustrated. $.60.*]

Faculty of Veterinary Medicine, National University of La Plata, Argentina

This book of 316 pages is a glorified catalogue of the school of veterinary medicine at La Plata, Province of Buenos Aires, containing a complete roster of officers and teachers and branches included in the veterinary curriculum, together with an extensive text of profusely illustrated technical material. The first 72 pages are on anesthesia in laboratory animals and special surgical operations, among which is a classical treatment of the subject of cartilaginous quittor of the horse *(gabarro cartilaginoso)*, with an historical sketching of the various operations employed at different periods since the beginning of formal veterinary education. The author of this chapter is to be complimented for his graphic description of this onetime important procedure. The chapter on avian pathology by Professor Ubach treats mainly of cholera in its relation to pasteurelloses of wild and domestic fowl and other animals.

The chapter on inhalation anesthesia introduces a special apparatus for the delivery, by pressure, of gaseous inhalants to the anesthetic cone, which is recommended to be of special advantage in experimental animals.

An anomalous carotid in a horse (fig. 1) serves the dual purpose of illustrating a circu-

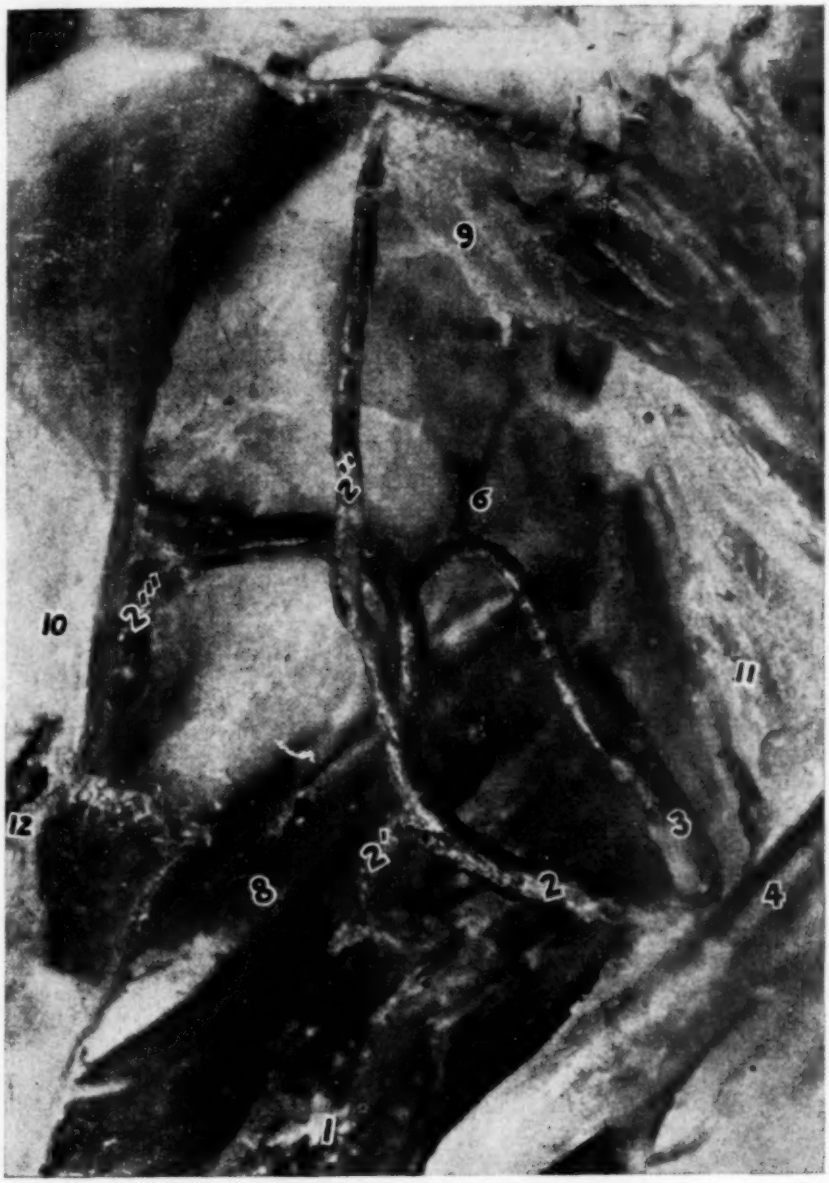

Fig. 1—An Anomalous Carotic Artery

1) Common carotid artery. 2) Occipital artery. 2') Prevertebral artery. 2") Mastoid artery. 2"') Retrograde artery. 3) Internal carotid artery. 4) External carotid artery. 5) The anastomosing branch between the occipital and internal carotid arteries. 6 and 8) Anterior rectus muscle. 9) Occipital bone. 10) Wing of the atlas. 11) Guttural pouch. 12) Atloid foramen for the retrograde artery.

latory deviation and at the same time showing that the chair of anatomy indulges in careful study of biological architecture.

The chapter on hematology deals mainly with the calcium-phosphorus ratio of blood serum. The chapters (98 pages) on the fishing industry, especially canning, portrays with numerous illustrations the magnitude of that branch of food production in Argentina. The authors close this excellent book with chapters on clinical entomology with emphasis on *Habronema muscae*, the causative agent of the cutaneous helminthiasis commonly named "summer sores." [*Faculadad de Medicina Veterinaria, Universidad Nacional de La Plata. Tomo III, Num. 1, 1940. 336 pages. Illustrated.*]

The Animal-Disease Fighters of World War II

ORGANIZATION OF THE BUREAU OF ANIMAL INDUSTRY
U. S. DEPARTMENT OF AGRICULTURE

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Business Manager: J. R. COHRAN.
Assistant Business Manager: N. A. OLMSTEAD.
Assistant to Chief: D. S. BURCH.
Animal Disease Station: ADOLPH EICHHORN, *Director.*
Animal Husbandry Division: HUGH C. MCPHEE, *Head Animal Husbandman in charge.*
Field Inspection Division: S. O. FLADNESS, *Principal Veterinarian in charge.*
Interstate Inspection Division: A. W. MILLER, *Head Veterinarian in charge.*
Meat Inspection Division: EDWARD C. JOSS, *Principal Veterinarian in charge.*
Pathological Division: HARRY W. SCHOENING, *Principal Veterinarian in charge.*
Division of Tick Eradication and Special Diseases: W. M. MACKELLAR, *Principal Veterinarian in charge.*
Tuberculosis Eradication Division: A. E. WIGHT, *Principal Veterinarian in charge.*
Division of Virus-Serum Control: D. I. SKIDMORE, *Principal Veterinarian in charge.*
Zoölogical Division: BENJAMIN SCHWARTZ, *Principal Zoölogist in charge.*

[1]On military furlough.

Federal Inspectors-in-Charge and the Coöperating State Officials

States	*Federal Officials*	*State Officials*
Alabama	R. E. Jackson	J. C. Sorenson, Auburn
Arizona	E. S. Winters	T. B. Jones, Phoenix
Arkansas	A. W. Rice	Joe S. Campbell, Little Rock
California	H. M. O'Rear	C. U. Duckworth, Sacramento
Colorado	Edgar Heiny	R. M. Gow, Denver
Connecticut	R. L. Smith	Claude Jones, Hartford
Delaware	O. L. Lockwood	Harry McDaniel, Jr., Dover
Dist. of Col.	A. E. Wight	
Florida	T. H. Applewhite	J. V. Knapp, Tallahassee
Georgia	W. C. Dendinger	Tom Linder, Atlanta
Idaho	F. F. Fischer	A. P. Schneider, Boise
Illinois	A. K. Kuttler	C. E. Fidler, Springfield
Indiana	W. A. Sullivan	J. L. Axby, Indianapolis
Iowa	J. A. Barger	C. C. Franks, Des Moines
Kansas	Ralph Graham	Will J. Miller, Topeka
Kentucky	E. E. Coshow	L. L. Breeck, Frankfort
Louisiana	W. A. McDonald	E. P. Flower, Baton Rouge
Maine	B. J. Cady	D. P. Corbett, Augusta
Maryland	O. L. Lockwood	Mark Welsh, Baltimore
Massachusetts	E. M. Aldrich	Jas. DeNormandie, Boston
Michigan	C. H. Hays	C. H. Clark, Lansing
Minnesota	W. J. Fretz	Ralph L. West, St. Paul
Mississippi	Hartwell Robbins	E. S. Brashier, Jackson
Missouri	E. C. Hughes	J. W. George, Jefferson City
Montana	G. W. Cronen	W. J. Butler, Helena
Nebraska	J. W. Murdoch	J. R. Snyder, Lincoln
Nevada	S. H. Still	W. B. Earl, Reno
New Hampshire	E. M. Aldrich	R. W. Smith, Concord
New Jersey	J. R. Porteus	R. A. Hendershott, Trenton
New Mexico	F. L. Schneider	Sam McCue, Albuquerque
New York	H. B. Leonard	E. T. Faulder, Albany
North Carolina	A. A. Husman	William Moore, Raleigh
North Dakota	F. C. Driver	T. O. Brandenburg, Bismarck
Ohio	A. J. DeFosset	F. L. Carr, Columbus
Oklahoma	C. H. Fauks	D. H. Ricks, Oklahoma City
Oregon	S. B. Foster	W. H. Lytle, Salem
Pennsylvania	J. B. Reidy	C. P. Bishop, Harrisburg
Rhode Island	E. M. Aldrich	R. G. Bressler, Providence

States	*Federal Officials*	*State Officials*
South Carolina	W. K. Lewis	W. K. Lewis, Columbia
South Dakota	Neil Plank	R. S. Robinson, Pierre
Tennessee	H. L. Fry	C. E. Kord, Nashville
Texas	H. L. Darby	T. O. Booth, Fort Worth
Utah	H. H. Cohenour	J. I. Curtis, Salt Lake City
Vermont	N. H. Howlett	E. H. Jones, Montpelier
Virginia	H. S. Miller	H. C. Givens, Richmond
Washington	J. C. Exline	M. O. Barnes, Olympia
West Virginia	H. M. Newton	T. C. Green, Charleston
Wisconsin	J. S. Healy	V. S. Larson, Madison
Wyoming	F. H. Melvin	H. D. Port, Cheyenne
Hawaii	A. H. Julien	E. H. Willers, Honolulu
Puerto Rico	E. E. Maas	Fernando A. Villamil, San Juan
Virgin Islands	E. E. Maas	Ralph L. Williams, Christiansted

Fighting animal diseases under these officers are subalterns, assistants, and a rank and file of accredited veterinarians, all graduates of recognized veterinary colleges, together with a personnel engaged in animal-disease research in the experiment stations of the federal government and states.

Summary of Bovine Brucellosis Work, United States Bureau of Animal Industry in Coöperation with Various States (October, 1942)

State or Territory	Tests made of blood samples during month		Tests of herds containing reactors				Calves vaccinated during month	Modified accredited counties	Total accredited		Herds and cattle under supervision		Total cattle on waiting list
					Reactors								
	Herds	Cattle	Herds	Cattle	For slaughter	* Held in calfhood vaccinated herds			Herds	Cattle	Herds	Cattle	
Alabama	5,215	18,680	92	2,972	199	5	103	31	763	128,510	139,575	684,339	102,215
Arizona	99	1,672	10	330	30	0	69	0	9	776	4,206	46,436	1,500
Arkansas	2,521	16,420	167	4,860	473	0	0	63	0	0	218,160	913,124	0
Colorado	23	501	7	363	1	30	359	0	23	1,128	2,519	44,490	5,167
Connecticut	159	3,409	34	975	88	0	136	0	434	11,525	691	14,893	0
Delaware	199	2,181	32	542	83	0	100	1	345	7,123	6,406	34,290	140
Florida	700	19,057	80	8,886	184	86	155	1	273	17,704	25,376	173,686	0
Georgia	1,034	11,224	67	3,497	206	0	0	65	28	2,522	129,025	378,135	205,458
Idaho	351	3,899	61	1,053	165	16	1,490	8	2,847	35,111	43,645	404,822	0
Illinois	490	4,861	114	1,787	48	264	382	0	513	11,866	13,880	212,584	27,438
Indiana	131	1,866	13	432	26	0	0	0	6,406	116,221	4,772	80,610	1,091
Iowa	916	15,866	372	7,451	1,184	0	332	0	3,382	58,906	28,071	448,521	4,908
Kansas	518	6,938	100	1,730	254	0	0	0	383	11,330	5,568	152,909	2,439
Kentucky	202	4,927	49	1,318	114	35	91	0	99	2,095	36,865	267,003	2,613
Louisiana	213	5,744	80	3,446	437	36	2,418	20	0	0	44,286	387,566	24,390
Maine	1,503	11,953	146	3,062	281	0	172	1	257	4,300	15,889	126,740	0
Maryland	938	9,225	127	2,170	199	47	314	4	3,831	63,996	24,383	157,099	831
Massachusetts	3	53	3	53	0	8	43	0	83	3,490	83	3,490	0
Michigan	1,099	10,939	162	2,480	276	133	238	26	3,185	53,346	27,874	279,601	3,510
Minnesota	3,121	55,343	255	4,644	1,307	0	0	19	15	548	90,097	1,299,696	0
Mississippi	237	2,918	28	1,314	83	0	0	4	504	11,090	7,683	121,881	0
Missouri	819	9,421	148	2,509	397	0	0	0	58	2,938	85,551	810,395	0
Montana	189	4,269	37	2,095	32	179	736	0	15	682	2,241	42,787	0
Nebraska	113	3,409	26	1,646	88	0	47	0	412	7,235	8,729	132,946	0
Nevada	27	841	4	249	43	21	51	0	41	1,760	229	7,746	0
New Hampshire	1,639	14,244	212	3,265	426	0	0	0	5,168	45,984	10,720	106,407	1,620
New Jersey	448	7,298	39	1,838	58	44	143	0	317	8,795	1,218	19,402	0
New Mexico	158	1,762	12	312	23	7	22	0	5	204	10,158	113,237	2,000
New York	289	7,765	112	3,470	62	473	1,868	0	1,680	43,142	5,924	171,997	0
North Carolina	721	8,982	34	1,972	74	0	0	100	669	27,333	249,084	601,149	0
North Dakota	1,121	17,458	254	4,595	709	79	706	24	45	3,511	34,160	757,830	172,643
Ohio	1,198	12,890	179	2,432	491	0	189	4	2,680	49,890	58,753	660,038	51,000
Oklahoma	345	7,596	71	3,543	189	0	42	0	914	18,134	46,722	407,547	5,726
Oregon	1,005	8,801	37	927	85	7	677	16	1	52	104,047	964,526	0
Pennsylvania	2,139	33,644	464	11,205	1,139	0	135	18	6,591	137,655	76,358	648,544	22,974
Rhode Island	5	132	1	10	0	1	1	0	37	668	89	2,329	0
South Carolina	432	3,057	12	1,143	93	5	4	8	82	5,594	38,424	100,262	4,000
South Dakota	108	3,352	42	2,065	110	124	699	0	165	3,607	2,119	55,688	7,000
Tennessee	141	4,865	58	2,558	90	51	474	7	467	14,397	46,023	328,213	2,000
Texas	201	4,005	16	957	27	22	283	0	1,295	16,647	2,267	42,395	0
Utah	215	1,571	34	454	58	0	342	2	0	0	32,805	232,808	0
Vermont	655	10,120	134	2,597	2	499	2,003	0	340	10,192	2,584	77,219	67,900
Virginia	918	13,459	96	4,343	246	19	69	75	266	14,231	190,912	697,479	84,523
Washington	1,321	11,712	139	3,831	444	68	1,358	17	0	0	68,883	648,000	0
West Virginia	958	8,112	59	1,661	98	0	176	27	276	10,256	68,981	344,586	0
Wisconsin	1,258	32,471	492	14,310	1,996	0	284	8	33,786	667,754	82,298	1,473,791	3,828
Wyoming	51	1,493	15	791	26	82	317	0	4	245	3,373	77,775	0
Totals	36,106	440,405	4,726	128,121	12,204	2,341	17,028	549	78,494	1,634,451	2,141,706	15,775,011	806,914

*Non-vaccinated reactors held during the month.

THE NEWS

AVMA

Board of Governors Meeting

The Board of Governors met in Chicago on Jan. 15, 1943. An all-day session was held, attended by Chairman O. V. Brumley, President W. W. Dimock, and President-elect C. W. Bower.

C. W. Bower and Frank Thorp, Jr. were selected to participate in the "Farm and Home Hour" broadcast over the Blue Network on January 30, in response to an invitation for two talks on livestock and poultry production, respectively, as affected by sanitation and disease control.

The preparation of a series of special articles was approved for release in the near future through the Associated Press. These will comprise four or five feature articles, illustrated, on the work of the veterinary profession, particularly as related to the food production program, veterinary military service, and public health.

Consideration was given to the reported reorganization of the federal Bureau of Animal Industry under the food production and distribution program being carried out under Secretary of Agriculture Wickard. A letter to Secretary Wickard was drafted, pointing out the undesirability of making any changes at this critical time either in the administration or make-up of the Bureau, which might impair seriously its effectiveness as an all-around agency for control of animal diseases.

The Board of Governors, in its capacity as Committee on Journal, has had under consideration for some time the acceptance of advertising for the American Journal of Veterinary Research. It was voted to accept advertising for the research journal, such advertising to be restricted to scientific equipment, laboratory chemicals, books, and similar products used by research and educational institutions.

Among other items considered were: interim reports or recommendations of special committees to be published in the monthly JOURNAL, veterinary quotas for the armed services in 1943, representation in conferences called by the Food Production Administration to consider feed shortages, particularly of protein supplements for livestock and dogs, and the present rationing situation as it affects veterinarians.

Executive Board Election in District VI

The nominating polls for the special election in District VI (Arizona, California, Canal Zone and Central America, Colorado, Mexico, Nevada, New Mexico and Utah), to select a successor for the unexpired term of the late Dr. W. L. Curtis, closed on December 23, 1942. The five nominees receiving the highest number of votes were:

G. W. Closson, San Gabriel, Calif.
C. U. Duckworth, Sacramento, Calif.
James Farquharson, Fort Collins, Colo.
L. M. Hurt, Los Angeles, Calif.
John L. Tyler, Whittier, Calif.

The names of the foregoing candidates are listed on election ballots mailed January 5 to members residing in District VI. The election polls will close March 5, 1943.

Veterinarians on "Farm and Home Hour" Broadcast Over the Blue Network January 30

President-elect Charles W. Bower, Topeka, Kan., and Dr. Frank Thorp, Jr., Agricultural Experiment Station, East Lansing, Mich., chairman of the AVMA Committee on Poultry, participated in the "Farm and Home Hour" broadcast over the Blue Network on January 30, 1943. They discussed livestock and poultry production, respectively, as related to the nation's food production program and as affected by sanitation and disease control.

The invitation for AVMA members to take part in this nationwide broadcast, which is a weekly feature originating in Chicago, was extended through the courtesy of Mr. William Drips, program director for the broadcast, and arranged by the Association's public relations counsel, Mr. L. R. Fairall.

Drs. Bower and Thorp shared fifteen minutes of the program's time of one-half hour. A bulletin announcing it was sent from the AVMA office to state and provincial association secretaries, resident secretaries, state veterinarians, and state veterinary chairmen with the request that the information be made as widely known as possible.

Committee on Animal Health of National Research Council Selected

Dr. Robert F. Griggs, Chairman of the Division of Biology and Agriculture, National Research Council has announced the selection of a Committee on Animal Health to supplement the activities of other committees of the

Division and the Council. The committee members are:

Chairman, G. H. Hart, V.M.D., M.D., Professor of Animal Husbandry, and Head, Division of Animal Husbandry, University of California; R. M. Bethke, B.S., M.S., Ph.D., in Charge Nutritional Investigations, Ohio Experiment Station; J. G. Hardenbergh, V.M.D., Executive Secretary, AVMA; C. C. Hastings, D.V.M., Practitioner, Williamsville, Ill. and member-at-large of the Executive Board, AVMA; H. W. Jakeman, V.M.D., Boston, Mass., Chairman of the Inter-Association Committee on Animal Disease and Production Efficiency; W. E. Petersen, B.S., M.S., Ph.D., Professor of Dairy Husbandry, University of Minnesota. Dr. Griggs, as chairman of the division is, ex-officio, also a member.

The appointment of such a committee has been under consideration for over a year by members of the National Research Council and other interested individuals. It is the outgrowth of increased recognition of the importance of animal health to production and reproduction of domestic animals and poultry, a field not specifically covered by any previously existing committee of the Council.

The divisions of the National Research Council include those on general relations (foreign and educational) and those related to science and technology such as anthropology and psychology, biology and agriculture, chemistry and chemical technology, engineering and industrial research, geology and geography, medical sciences and physical sciences. For many years, there has been a veterinary member of the National Research Council in the Division of Medical Sciences; the present incumbent is Dr. Adolph Eichhorn, of Beltsville, Md.

The new Committee on Animal Health will formulate its program and meet at the call of the chairman. Other committees of the Division of Biology and Agriculture include those on animal nutrition, biological processes of aging, ecology of animal populations, ecology of grasslands of North America, food and nutrition, forestry, genetics of pathogenic organisms, human heredity, etc.

Can You Help Locate These Lost Members?

The aid of JOURNAL readers is solicited in locating the following members, mail to whom has been returned to the Association's central office. The last known address of each is given. Should you be able to provide information as to present residence, your advice *via* postcard or letter will be greatly appreciated.

Allen, G. H., Northwest Poultry & Dairy Products Co., Portland, Ore.
Antroinen, Aaron P., Central Apts., Apt. 10, Crookston, Minn.
Beauchamp, John W., Bellingham Hotel, Bellingham, Wash.
Bruce, Ralph A., Prescott, Kansas.
Case, R. W., 1534 W. McDowell, Phoenix, Ariz.
Castro, Fred, General Delivery, Omaha, Neb.
Cox, Wm. L., Box 2074, Raleigh, N. Car.
DeMott, Andre R., Utica St., DeRuyter, N. Y.
Derrick, Geo. W., Elbridge, N. Y.
Faulk, A. L., 106th Med. Reg.—31st Div., A.P.O. No. 31, Camp Blanding, Fla.
Feinberg, Sidney, 88 Charles St., Boston, Mass.
Franklin, Ted E., 3121 Avenue G., Fort Worth, Texas.
Hander, Raymond T., Box 865, Childress, Texas.
Hantman, Harris W., Station Hosp., Grenier Field, Manchester, N. H.
Henkel, Ernest L., 907 Myrtine St., Enumolaw, Wash.
Hergren, Douglas R., 830 Shawano Ave., Green Bay, Wis.
Holtzman, Jacob, Station Hosp., Army Air Base, Fort Douglas, Utah.
Keane, John J., Fort Adams, Rhode Island.
McCamish, John N., c/o Skyland Grocery, Ruidoso, N. Mex.
MacEachern, Gordon, A.A.B., Jacksonville, Fla.
Mathis, Rudy C., State Veterinarian, Atlanta, Ga.
Moffat, Geo. Colvin, 5732 W. Cermak Rd., Cicero, Ill.
Nevin, Stanley M., Fort Jackson, S. Car.
O'Neal, Wayne S., Box 95, St. Charles, Mo.
Prchal, Charles F., 994 Harrison, Memphis, Tenn.
Reed, Myron D., New York State Veterinary College, Ithaca, N. Y.
Remsberg, Glen S., Chicago Q.M.C. Depot, 1819 W. Pershing Rd., Chicago, Ill.
Rodgers, Robert J., c/o General Delivery, Laredo, Texas.
Sadow, I. J., Ft. Benning, Ga.
Spears, C. J., Dublin, Ga.
Thompson, L. G., Swainsboro, Ga.
Wingerter, A. R., R.R. No. 1, Big Rapids, Mich.

Suggestions for Emergency Dog Food

Interest in substitutions for the dog foods habitually used increases as the war continues to impose restriction on various components of the human diet. Ingredients used in the preparation of food stuffs are largely in the hands of or under contract to manufacturers of commercial animal feeds. These ingredients are, therefore, not available to the owners of pet animals. The use of properly prepared dry dog food of good quality, when available, will provide reasonably satisfactory nourishment for pet animals and at the same time avoid the use of foods intended for human consumption. This is very important during the war emergency.

The amount of good quality dog food which can be made available is limited, however, due to wartime restrictions on quality ingredients,

transportation, facilities and other factors. Practitioners should keep in mind that pets can be maintained on meatless diets should it become necessary to do so. Temporarily, even though biologically deficient, diets can be prepared from ingredients such as:

Stale bread (preferably enriched)....oz. vi
Boiled potatoes.....oz. ii to iv
Ground tripe, fish products, or meat by-products or milk by-products..oz. ii to iv

Fish by-products or animal feeding oils (not human grade), tomato pumice, prune paste, sour or clabbered milk, whey or butter milk, cottage cheese, boiled veal bones, ground raw or cooked tripe, enter into the component of this formula. A formula for a temporary menu to make one pound of dog food is as follows:

Dried bread .....oz. vi
Boiled potatoes.....oz. ii to iv
Ground tripe, fish products, meat or milk by-products.....oz. ii to iv
Veal bone or other soft ground bone.....oz. ii to iii
Fat.....oz. ss to i
Animal feeding fish oils.....oz. ss (tablespoonful)

M. L. MORRIS, *Executive Secretary, Joint Committee on Foods.*

What the Newspapers Say

(Excerpts from Educational Publicity Material issued by the AVMA Public Relations Department.)

Dubuque (Ia.) Telegram-Herald
(Nov. 4, 1942)

Ames, Ia.—(U.P.)—Robert J. Kirkpatrick, Oakland, Minn., has been elected president of the Iowa State College Chapter of the Junior American Veterinary Medicine Association.

Other officers are:

Robert Loften, Lakota, N. D., vice-president; Clark Stillinger, Red Oak, secretary; Mac H. McMillan, Estherville, treasurer; Joe Loucks, Cherokee, senior critic; James Rhodes, Fort Dodge, sergeant-at-arms, and Burton Gray, Ames, president-elect.

Sturgis (S. D.) Record
(Nov. 19, 1942)

One of the world's most ancient swine diseases, erysipelas, is now spreading so extensively that it may soon outrank hog cholera as a killer of farm animals, veterinary authorities report in the official Journal of the American Veterinary Medical Association.

"The disease never before has struck so fruitful a medium for spreading as the congested swine population of the American corn belt, with the prospect that it can root itself widely and permanently in American soil," the report states. . .

Ft. Worth (Tex.) Live Stock Reporter
(Oct. 22, 1942)

Confidence in the ability of the veterinary profession to keep animal diseases under control despite the great increase in livestock numbers was expressed recently in Chicago by Dr. John R. Mohler, BAI chief. Dr. Mohler, addressing the annual convention of the American Veterinary Medical Association, also stated that the federal meat inspection service would be able to handle the increased volume of work caused by newly created wartime requirements. . .

Prairie Farmer
(Jan. 9, 1943)

American veterinarians are helping England control Bang's disease—but they have to fly to the British Isles to contribute.

Valuable cultures, vaccines and equipment also are flown across the Atlantic. Bombers being delivered to England are used to transport veterinarians and their equipment. As a result, says Dr. John S. Mohler, chief of the U. S. Bureau of Animal Industry, we are helping increase the war time beef and milk output of the British Isles.

Cedar Rapids (Ia.) Gazette
(Nov. 29, 1942)

Devastating hog cholera outbreaks in 35 communities have been reported by veterinarians during the last two weeks, an Eastern Iowa Veterinary Association bulletin reveals.

Omaha (Nebr.) World-Herald
(Nov. 26, 1942)

Chicago, Nov. 25 (INS)—Farmers today were warned to keep a constant check on their hogs to prevent influenza which this winter may seriously hamper America's pork production.

The American Veterinary Medical Association pointed out that an influenza epidemic during the last war was serious, and that with increased efforts to raise pork similar losses may be suffered if proper precautions are not taken.

Columbia Missourian
(Oct. 17, 1942)

Dr. A. J. Durant, chairman of the department of veterinary science in the University, has accepted an appointment as chairman of

the resolutions committee of the American Veterinary Medical Association for 1942-1943.

Others on the committee are R. R. Dykstra of Kansas State College; W. L. Gates, Clarksdale, Miss.; S. W. Haigler, St. Louis; Ashe Lockhart. Kansas City; A. W. Miller, Washington, D. C.; H. A. Seidell, Omaha, Neb.; and J. G. Hardenbergh, Chicago, Ill.

Saco (Mont.) Independent

In view of the increase in hog production in Montana and the importation of breeding stock from other parts of the country, swine growers should be aware of swine erysipelas, a disease that is reported by the American Veterinary Medical Association to be spreading in American farming areas, says Dr. Hadleigh Marsh, head of the Montana Veterinary Research laboratory at Montana State college.

Swine erysipelas has not caused any serious loss in Montana, he said, but nevertheless hog growers should be cautioned about it in view of the expanded production that is taking place. . .

Headlines

Lexington Kentucky Herald:

"Veterinarians Fear Outbreaks of Disease: Issue 'Don't List.'"

Deer Lodge (Mont.) Post:

"Farmers Warned of Hog Disease. Swine Erysipelas Warning Is Given by Head of Research Laboratory."

Britton (S. D.) Journal:

"Prevent Livestock Diseases American Veterinary Medical Association Urged."

Croton (S. D.) Independent:

"Swine Erysipelas Spreads Rapidly, the *Journal of the American Veterinary Medical Association* Warns."

Mankato (Kans.) Record:

"Swine Erysipelas a Growing Danger," says the *Journal of the American Veterinary Medical Association.*

Princeton (Ky.) Leader:

"Farmers Warned of Hog Disease," quoting President Dimock of the *American Veterinary Medical Association*, concerning the swift spreading of swine erysipelas.

Holbrook (Nebr.) Observer:

"Urges Farmers to Check for Hog Influenza" introduces AVMA advice on the hampering effects of that disease.

Nashville (Tenn.) Sun:

"U. S. Veterinarians Mobilize for Action" heads a story of what the AVMA is doing in the food-for-freedom program.

Omaha (Nebr.) Morning Herald:

"Food Problem Gone to the Dogs" under which is told the effect food restrictions will have on household pets and the plans proposed to relieve the situation.

Minatare (Nebr.) Free Press:

"War Also Brings Livestock Diseases" is the headline under which former President Jakeman reviews the effect all wars have had on the reduction of food supply by farm-animal diseases.

Kansas City Drovers Telegram:

"Don't," is the caption of a leading editorial quoting the list of recommendations—"dont's" released by the AVMA in its advice to farmers on disease prevention.

Other Newspaper Comment

Vicksburg (Miss.) Post

(Nov. 23, 1942)

All meat and dairy products served in mess halls or restaurants at Army installations must pass rigid inspection by the Veterinary Service of the Medical Department, the War Department announces.

Except under unusual circumstances meat products must originate in plants operating under the supervision of the Bureau of Animal Industry of the United States Department of Agriculture. Only those milk plants and dairy farms operating under the United States Public Health Service Ordnance and Code are acceptable to the Army, unless veterinary inspectors approve additional sources. The same rigid inspection given meat and milk applies to ice cream.

So broad are the functions of the veterinary service that even the ingredients of inks used in stamping meats come under the scope of the inspections.

In general the meat and dairy hygiene inquiry includes the inspection of meats, meat-food products, milk and dairy products, game, fats and cooking oils, whether fresh, frozen, canned or otherwise processed. The scope of these inspections not only covers Army commands but also commercial vehicles and vessels used as troop transports and civilian edu-

cational and other civilian activities where troops are rationed.

Each veterinary officer makes a daily record of his inspections which is forwarded to the Surgeon General of the Army through the command surgeon. The Surgeon General thus is enabled to keep in close touch with food inspection activities.

Food and dairy inspection covers only one phase of veterinary activities, the health and care of all Army animals still being the major veterinary activity.

Wisconsin Agriculturist
(Nov. 14, 1942)

Packers report that some dairy cows are coming in from the dairy district, but that these are not high producing milk cows. It is true that there are many farm dispersal sales this fall, but it also is true that the best cows are being picked up by dairymen who find themselves in position to add two or three of these good ones to their own herds. Some of the smaller herds are being built up with the choice milkers from herds now being sold. So the situation is not so serious as some newspaper stories would show. Wisconsin dairy production is continuing to roll up more billions of pounds of highest quality milk.

APPLICATIONS

The listing of applicants conforms to the requirements of the administrative by-laws—Article X, Section 2.

First Listing

AVERY, HERBERT W.
Spring Hill, Kansas.
D.V.M., Kansas State College, 1934.
Vouchers: F. B. Croll and Ashe Lockhart.

CRUTCHFIELD, WM. O.
101 Williamson Rd., Roanoke, Va.
V.M.D., University of Pennsylvania, 1942.
Vouchers: D. W. McTyre and H. T. Farmer.

DAVIS, R. R.
1218 Roosevelt, San Antonio, Texas.
D.V.M., Texas A. & M. College, 1938.
Vouchers: T. O. Booth and Ashe Lockhart.

FOOTE, LON E.
2716 Bosque Blvd., Waco, Texas.
D.V.M., Kansas State College, 1938.
Vouchers: T. T. Christian and J. H. Burt.

HARDY, D. B.
Liberal, Kansas.
D.V.M., Indiana Veterinary College, 1915.
Vouchers: W. F. Dunaway and Chas. Webster.

HOUSE, DONALD DEAN
A.A.F.B.A.S., Bainbridge, Ga.
D.V.M., State College of Washington, 1937.
Vouchers: J. C. Exline and M. O. Barnes.

MCLAUGHLIN, A. R.
219 W. 74th St. Terrace, Kansas City, Mo.
D.V.M., Michigan State College, 1926.
Vouchers: Ashe Lockhart and G. L. Dunlap.

MCLEAN, HARVEY ROSS
1368 Main St., E., Hamilton, Ont., Can.
B.V.Sc., Ontario Veterinary College, 1936.
Vouchers: C. D. McGilvray and W. J. Rumney.

SERROT, M. D.
Medicine Lodge, Kansas.
D.V.S., Kansas City Veterinary College, 1910.
Vouchers: F. B. Croll and Ashe Lockhart.

SNYDER, RAYMOND C.
Walnut St. & Copley Rd., Upper Darby, Pa.
V.M.D., University of Pennsylvania, 1933.
Vouchers: E. L. Stubbs and W. J. Lentz.

STAGGS, GEO. W.
Rt. No. 2—Box 3, Tacoma, Wash.
D.V.M., Washington State College, 1920.
Vouchers: R. H. Bradbury and R. A. Button.

STINCER, M.
Correa No. 16, Havana, Cuba.
D.V.M., University of Havana, 1939.
Vouchers: F. Santa Maria and S. V. Ramsey.

TIERKEL, ERNEST, S.
328 W. 89th St., New York, N. Y.
V.M.D., University of Pennsylvania, 1942.
Vouchers: J. D. Beck and E. J. Van Tilborg.

THOMAS, GEORGE O., JR.
Assistant Port Vet., New Orleans Port of Embarkation, New Orleans, La.
D.V.M., Texas A & M College, 1938.
Vouchers: Andy Crawford and W. T. Oglesby.

TROWBRIDGE, J. W.
Malden, Mo.
D.V.M., St. Joseph Veterinary College, 1922.
Vouchers: G. L. Dunlap and Ashe Lockhart.

WARD, H. C.
508 Market St., Fulton, Mo.
M.D.C., Chicago Veterinary College, 1910.
Vouchers: G. L. Dunlap and Ashe Lockhart.

WILKINSON, J. A.
1817 Western Ave., Fort Worth, Texas.
V.M.D., University of Pennsylvania, 1907.
Vouchers: W. L. Endsley and H. W. Schoening.

Second Listing

Bliss, C. A., Osborne, Kansas.
Brown, C. W., P. O. Box 443, Edinburg, Texas.
Callahan, F. H., Box 221, 317 N. E. 11th St., Abilene, Kansas.
Cavanaugh, E. C., 200 Horner St., Johnstown, Pa.

Cheshire, J. B., 210 W. 3rd St., Maryville, Mo.
Crenshau, E. R., P. O. Box 274, Garland, Texas.
Dunbar, L. A., 2733 Saltillo St., San Antonio, Texas.
Gililland, W. J., Hereford, Texas.
Grandfield, L. G., 1921 E. Douglas, Wichita, Kansas.
Gray, Harry P., 2050 Kings, Springfield, Mo.
Hannemann, Walter H., 1504 N. 24th St., Kansas City, Kansas.
Haynie, E. H., 8343 Wornall Rd., Kansas City, Mo.
Hoedt, W. H., 432 Larchwood Ave., Bywood Upper Darby, Pa.
Howard, J. E., 862 McNichols Rd., W., Detroit, Mich.
Indorf, John H., St. Francis, Kansas.
Johnson, H. S., 119 Federal St., N. S. Pittsburgh, Pa.
Kraft, Irene, 789 N. Broadway, White Plains, N. Y.
McGilvray, John H., Minnesota Avenue at 34th St., Sioux Falls, S. Dak.
McKee, Gradon S., R.D. No. 3, Washington, Pa.
Maier, M. E., 901—10th St., Orange, Texas.
Miller, E. V., Bolivar, Mo.
Naylor, J. Richard, 8000 E. Colfax Ave., Denver, Colo.
Puterbaugh, A. R., R.R. No. 5, Box 144, New Castle, Ind.
Shepard, Harry, Box 524, Kerrville, Texas.
Strong, Warren M., Defiance, Ohio.
Tutt, J. F. D., "Rothiemurchus," St. Cross, Winchester, Hants, England.
Umberger, G. M., Harveyville, Kansas.
Whatley, D. E., 1930 Gage Blvd., Topeka, Kansas.
Wheeler, N. M., Box 476, Winnsboro, Texas.
White, Edward A., Sussex, N. J.

1943 Graduate Applicants

(First Listing)

The following are graduates who have recently received their veterinary degrees and who have applied for AVMA membership under the provision granted in the administrative by-laws to members in good standing of junior chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

Kansas State College*

All of the following applicants, with the exception of those otherwise noted, were vouched for by Dean R. R. Dykstra and Dr. E. J. Frick.

ATKINSON, GEORGE, D.V.M.
1927 N. Ash, Hutchinson, Kansas.

BECKENHAUER, NEIL D., D.V.M.
1329 Anderson, Manhattan, Kansas.

BENDER, HENRY, D.V.M.
615 Topeka Blvd., Topeka, Kansas.

BEYLER, CLIFFORD D., D.V.M.
R.F.D., Harper, Kansas.

BURKERT, LESTER, H., D.V.M.
508 Walnut St., Valley Falls, Kansas.

BUSSET, BURSON, D.V.M.
R.F.D. No. 5, Manhattan, Kansas.

CAMPBELL, T. CLARK, D.V.M.
Laurel, Neb.

COATES, ALBERT S., JR., D.V.M.
Box 490—R.F.D. No. 2, Kansas City, Kansas.

ELLIOTT, DEAN, D.V.M.
R. R., Elmo, Kansas.

ERICKSON, ROBERT N., D.V.M.
931 Thurston, Manhattan, Kansas.

GORY, EARL, D.V.M.
Rt. No. 1—Box 96, Hoisington, Kansas.

GRIFFITHS, CLAYTON B., JR., D.V.M.
1100 E. Haley, Santa Barbara, Calif.

GURSS, GERALD, D.V.M.
Burlingame, Kansas.

HANDEL, ROBERT T., D.V.M.
1850 Fuller Way, Napa, Calif.
Vouchers: E. J. Erick and W. L. Sippel.

HENTZLER, ROBERT W., D.V.M.
2714 Kansas Ave., Topeka, Kansas.

The January, 1943 graduating class in veterinary medicine, Kansas State College. The graduates have all applied for membership in the AVMA.

HOSTETLER, CLARENCE, D.V.M.
R.R. No. 2, Harper, Kansas.
KIMBELL, KENNETH E. C., D.V.M.
401 E. Main, Lyons, Kansas.
KNOCHE, RALPH W., D.V.M.
Adrian, Minn.
LUDWIG, A. N., D.V.M.
312 S. 16th, Parsons, Kansas.
LUNT, DONALD W., D.V.M.
Yankee Hill, Calif.
MESSER, RALPH, D.V.M.
R.R. No. 2, Lawrence, Kansas.
MILLS, CARROLL, D.V.M.
Blaine, Kansas.
MONTGOMERY, E. L., D.V.M.
R.R. No. 2, Parsons, Kansas.
Vouchers: E. J. Frick and W. L. Sippel.
MORRIS, OLIN W., D.V.M.
1709 Anderson, Manhattan, Kansas.
MYERS, B. J., D.V.M.
Bethel, Kansas.
NELSON, ROBERT K., D.V.M.
3438 W. 65th Pl., Chicago, Ill.
QUINBY, BYRON W., D.V.M.
431 Pottawatomie St., Manhattan, Kansas.
ROBB, ARTHUR D., D.V.M.
Wamego, Kansas.
RUF, JESS WAYNE, D.V.M.
1107 North C, Arkansas City, Kansas.
SEBREE, LORRAIN O., D.V.M.
Rt. No. 4—Box 234, Kansas City, Kansas.
SHEEHEY, M. S., D.V.M.
Belle Plaine, Kansas.
SHORT, GEORGE E., D.V.M.
1115 Bluemont Ave., Manhattan, Kansas.
SIMIC, WILLIAM J., D.V.M.
Superior, Neb.
SPENCER, R. N., D.V.M.
1400 Shoemaker, Leavenworth, Kansas.
STODDARD, EDWARD D., D.V.M.
1000 Colorado St., Manhattan, Kansas.
SWENSON, MELVIN J., D.V.M.
Rt. No. 2, Concordia, Kansas.
SYMNS, J. CARYLE, D.V.M.
Rt. No. 3, Hutchinson, Kansas.
THOMAS, ROY C., D.V.M.
604 N. 29th St., Parsons, Kansas.
TRIMBLE, MONTE M., D.V.M.
1709 Cleveland Ave., Kansas City, Kansas.
UPHAM, ROY W., D.V.M.
Rt. No. 3, Junction City, Kansas.
WEBB, LOWELL M., D.V.M.
Beverly, Kansas.
WHITEMAN, CHARLES ELMER, D.V.M.
Carrollton, Ill.
WILKINS, LYSLE M., D.V.M.
1214 Vattier, Manhattan, Kansas.
WILSON, MARK, D.V.M.
Laverne, Okla.
WINTERS, BUFORD DALE, D.V.M.
R.F.D. No. 1, Parsons, Kansas.
Vouchers: E. J. Frick and W. L. Sippel.
WORTHMAN, ROBERT P., D.V.M.
1234 D. St., Lincoln, Neb.

AMONG THE STATES

California

Dr. B. F. Hadley, patriarch of the veterinary service of Wisconsin since time-out-of-mind, in an interesting letter about this and that of the upper frame reminds us that the readers of the JOURNAL might be interested in knowing that the heads of three divisions of the California Agricultural Experiment Station are veterinarians, to wit: *Animal Husbandry*, G. H. Hart; *Dairy Industry*, C. L. Roadhouse; and *Veterinary Science*, C. M. Haring.

* * *

California Civil Service Positions for Veterinarians.—The California State Personnel Board announces civil service positions for Veterinary Meat Inspector (salary range $200-$260) and Veterinary Livestock Inspector (salary range $215-$275). The requirements for the former are graduation with a doctor's degree in veterinary medicine from an institution of recognized standing; the latter, possession of a valid license to practice veterinary medicine in California.

Applications may be filed any time during 1943 on form 660. Forms and full information may be obtained from the State Personnel Board Office, 1015 L Street, Sacramento. The California residence requirement has been waived and examinations are open to any United States citizen meeting other entrance requirements.

Canada

Personals.—Dr. Riddell, Orangeville (Ont. '88), owns and trains 20 to 30 light harness horses, despite his advanced years and the fact that he has just recovered from a cataract operation which restored his lost eyesight. A banquet was given in his honor by the trotting-horse men of the province.

* * *

Now that the demand for all classes of horses has increased, the work of the stallion registration board has been resumed. Sinclair (Ont. '88) is the veterinary inspector of the board.

* * *

The older graduates of the Ontario Veterinary College will be grieved to learn of the death of Dr. King Smith (M.D.) the only son of Prof. Andrew Smith, founder of veterinary education in North America. Dr. Smith had been in ill health for several years. He was graduated in medicine by the University of Torronto and at the turn of the century was a member of the affiliated veterinary faculty.

s/J. A. CAMPBELL, *Toronto, Ont.*

* * *

Charles C. Mitchell has been appointed Acting Dominion Animal Pathologist vice E. A.

Watson, retired on account of ill health. Dr. Watson has been living in retirement at Victoria, B. C., since September last.

Florida

Corrigendum.—In the December issue of the JOURNAL the new officers of the Florida Veterinary Medical Association were incorrectly reported. The new officers are:

C. E. Bild, Miami, *president.*
V. L. Bruns, Williston, *vice-president.*
J. V. Knapp, Tallahassee, *secretary-treasurer.*

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Personal.—C. N. McBryde, of the Dorset, Niles and McBryde triumvirate, U.S.B.A.I. (retired), basking in Florida for the winter, writes from Winter Park: "I feel that I should be engaged in some sort of defense work and have filled out several questionnaires indicating the line of work for which I feel qualified."

Illinois

Certificate of Merit for Illinois Farmer.—Carl M. Bormet of Tinley Park, skirting the southern boundary of Chicago, received the first "certificate of merit" issued by the Blue Network for stepping up production on his farm. On his 280-acre farm, Bormet increased his corn crop 15 per cent, soybean crop 300 per cent, and milk production 24 per cent, all increments over the previous year.

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The A.M.G.A.—The American Milk Goat Association held its thirty-eighth annual meeting at the Hotel Morrison, Chicago, Oct. 27, 1942. Presiding over the meeting was none other than Dr. A. J. Durant, head of things veterinary at the University of Missouri. The announcement is late because the report of the meeting came only with the December number of the *Goat World* which arrived too late for earlier attention. The detailed report, containing much about a futile effort to consolidate the two main national societies devoted to the caprine species, shows among other things of interest that Dr. Durant was reëlected to the presidency by a vote of 182 out of 205 cast.

[Obviously, judging from the size of the meeting and the interest reflected by the published proceedings, here is a branch of milk, meat, hide, and fur production that veterinary pathologists are overlooking. Generic problems remain foreign to the veterinary profession only to the extent of their neglect by its pathologists.—*Ed.*]

Iowa

East Central Association.—The Eastern Iowa Veterinary Medical Association held a lively meeting at the Montrose Hotel, Cedar Rapids, Dec. 10, 1942, with an attendance of 31 from 12 adjacent counties. Meat inspection had a prominent place on the program. E. M. Burroth, inspector-in-charge at Cedar Rapids and W. N. Nuckolls of the Wilson packing plant were the speakers. They explained the purposes and activities of the Meat Inspection Division of the U.S. Bureau of Animal Industry. W. S. O'Brien of Ryan, and W. L. Kellog of Monticello, spoke on swine practice, and C. E. York of Monticello, on diseases of poultry. The relation of nodular disease of sheep to the supply of absorbable surgical sutures: and of abscesses, hog-cholera, swine erysipelas, vitamin A anasarca of cattle, sexual odors of boar meat, Cysticercus infection, kidney worm and other parasites, and tapeworm cysts of swine were among the diseases emphasized by the bureau inspectors. Other speakers were:

Lieut. C. C. Hanna, V.C., U.S. Army: "Duties of the Army Veterinarians" in the inspection of food of animal origin. He described the various classes of modern army rations.

Sergeant Kermit McLain, lay inspector, lead the discussion. The practitioner audience kept the official reporters (Burroth, Nuckolls, Hanna, and McLain) busy answering questions on their duties as guardians of human food.

President P. V. Neuzil, and Secretary C. C. Franks, of the Iowa Veterinary Medical Association announced the program of the annual meeting at Des Moines, Jan. 26-28, 1943.

The Central Association elected the following officers: I. F. Irwin, Iowa City, *president;* Maurice C. Larsen, Keystone, *vice-president;* Merrill H. Williams, Cedar Rapids, *secretary-treasurer.* Meetings were set for January at Cedar Rapids, February at Iowa City, and March at Tipton, pursuant to the customary sequence of the past ten years.

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East Central Veterinary Medical Association.—The meeting of the East Central Veterinary Medical Association was held in the Hotel Montrose, Cedar Rapids, Jan. 14, 1943. Forty-six members from 17 counties were present. The speakers and their subjects were as follows:

Wiley Wolfe, Grand Mound: "Swine Pox."
Joe W. Giffee, Cedar Rapids, federal veterinary inspector on swine disease control: "Dangers of Using Swine Erysipelas Culture in Swine Susceptible to Cholera."

I. W. Moranville, Durant; **F. J. Crow**, Iowa City; **Donald L. Jones**, Walcott; **George O. Shipley**, West Branch; **R. E. Elson**, Vinton; and **A. R. Menary**, Cedar Rapids, gave case reports on: "The Diagnosis, Husbandry, and Treatment of Shipping Fever of Cattle."

C. H. Banks, Tipton: "Bloody Urine in Swine

Droves." Discussed by Dr. R. M. Hofferd of Cedar Rapids.

B. L. Procter of Hazelton, and **J. C. Glenn**, Norway: "Phenothiazene Poisoning of Swine."

C. E. Bassler, Ainsworth: "Nutrition Problems in Cattle and Swine." The subject of vomition in feeder and dairy cattle brought forth a lively discussion.

A. R. Stephenson, Bennet: "Nutrition Disturbance in Swine."

J. C. Glenn, Norway: "Fowl Pox."

R. J. Beamer, Iowa City: "The Treatment of Colds, Coryza, Pox, and Laryngo-Tracheitis in Poultry."

P. V. Neuzil, Blairstown, gave numerous case reports on poultry diseases concerning diagnosis, handling of infected flocks, sanitation, and treatment.

The next meeting will be held at Iowa City, Thursday, Feb. 11.

s/R. E. Elson.

Kansas

State Association.—The proceedings of the thirty-eighth annual meeting held in Wichita, Jan. 5 and 6, 1942 comes in the form of a booklet, edited by Secretary Bower. Besides the roster of officers and committees, the booklet contains the list of active members, report of the business sessions, and the papers and addresses presented. Gene Moriarity, speaking for Mayor Dotson, honored the Association with an address of welcome in which recollections of the profession in the horse and buggy days were recalled and compared with *statu quo praesens*. Professor Frank of the state college had saved Gene a year of futile training of a "fast one" by detecting the presence of an unsuspected "jack" by means of an x-ray examination, which in former days would have brought plenty of grief to the best teamster of light harness horses—an excellent example of scientific advancement in equine clinical work. In reply, Professor Burt, anatomist of K.S.C. also did some reminiscing when he related that a Kansas State meeting in the old Carey House some years ago drew an audience of three. On the literary program were:—

J. S. Hughes, professor of chemistry, Kansas State College: "Animal Nutrition," touching upon the main problems of that science in the feeding of farm animals in its relation to disease: pregnancy disease of ewes, mineral hunger, avitaminoses, roup, pink eye, rickets, etc.

James Farquharson, professor of surgery, Colorado State College: "Bovine Practice," dealing at length upon necrotic hepatitis of feeder cattle which is causing heavy losses in deaths and condemned livers; calf diphtheria for which the speaker has introduced sulfa drug treatment with encouraging results; and anasarca, an atypical vitamin A deficiency.

H. W. Jakeman, Boston, Mass., president (1941-42) of the American Veterinary Medical Association: "The Influence of the AVMA on the Past, Present and Future of the Veterinary Profession," outlining the work of the Association since its organization in 1863, down to its present activity in the war effort. Knowledge of our history as the basis for future planning, characteristic of Dr. Jakeman's reasoning and foresight, was emphasized, along with recommendations on the work in hand.

W. H. Haskell, veterinarian of the United States Public Health Service: "The Milk Supply of the Nation," related the difficulties met in starting reforms in milk production and distribution under diversified local regulations, and criticized the veterinary colleges for not realizing that "there is such a thing in this country as milk sanitation," without, however, clocking the various curriculums in that respect. The services of the mechanical engineer familiar with the intricate mechanisms of the pasteurizing plant was pointed out as essential to proper milk sanitation. Brucellosis, typhoid fever, paratyphoid fever, salmonelloses, scarlet fever, septic sore throat, and diarrhea were named as the main milk-borne diseases.

W. F. Irwin, Tulsa, Okla.: "Some Practical Procedures in Small Animal Practice," touched upon surgical technique and blood transfusion with special reference to its indications.

S. L. Stewart: "Report on the Meeting of the House of Representatives of the AVMA, 1941," relating the progress made in dog-food testing, and various features of the literary program.

P. B. Darlington: "The Present Status of Kansas Municipal Meat Inspection," stressed the need of improvement in that field and the difficulty of obtaining the proper laws and preventing subversive legislation on appropriate supervision of local slaughterhouses.

A new constituition and by-laws was read into the records for future revision and adoption. The published list of active members contains 147 names, to which were added 32 new members: total 179. Among those not mentioned above who participated in the discussions were: Kappenberger, Dietrich, Sanders, Kirkpatrick, Roderick, Dykstra, Dunlap, Crispel, Heisel, Hammers, Gish, Kushner, Lumb, Bogue, Dotson, Grandfield, Leasure, Dudley, Nelson, Croll, Rathman, Goodman, Stephenson, and Dondonville. R. F. Coffey, president, officiated throughout the session.

The officers elected were Harry F. Dotson, Wichita, *president;* J. W. Lumb, Manhattan, *vice-president;* A. H. Gish, Eldorado, *member of the Board of Directors;* Charles W. Bower, Topeka, *secretary-treasurer* (method of reëlect-

ing, as secy-treas., for the twentieth time, the president-elect of the AVMA is not stated).

Manhattan was chosen as the place of meeting for 1943. Balance in the treasury, $1,002.52.

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From the K.S.C. News Bureau.—Production of beef is retarded by protozoan parasites. . . . Other parasites kill large numbers of chickens and turkeys. . . . Heavy losses are sustained from condemned cattle and sheep livers ruined by flukes. . . . Among the parasites, strongyles are the most important, many inhabit the stomach, small intestine and lungs, where they take blood and lymph in considerable quantity, reducing resistance and causing death; they hinder the production of beef and mutton. . . . The loss from parasites is estimated by the USDA to be 125 million dollars annually.

s/J. E. Ackley.

Maine

State Association.—A meeting with 25 in attendance was held at Lewistown, Oct. 14, 1942. The sessions were held at the Winter House in Auburn where there were more accommodations than at Lewistown. The program consisted of a dinner and a literary program:

J. F. Witter, secretary-treasurer: "Lantern Slides on Events of Previous Meetings."

Hon. L. K. Green, mayor of Auburn and dean of meat inspection in Maine: "Demonstrations of Abattoir Specimens of the Reproductive Organs of Cows."

H. N. Eames, Brunswick: "Sanitation and Classification of Cows in Controlling Mastitis." Discussion by **E. C. Moore,** of Lewistown.

H. W. Jakeman, Boston: "The Rôle of the Veterinarian in the War."

Geo. M. Potter, Portland: "The Business Meeting of the AVMA."

Capt. Samuel Levine and **Lieut. Stadler,** V.C., U.S.A., of Portland: "Style and Quality of Army Canned Food."

The Committee on Fees, S. W. Stiles, of Portland, *chairman* made a progress report to be presented for action at the next meeting.

s/J. F. WITTER, *Secretary-Treasurer.*

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Bovine Brucellosis Control.—One of the current problems of the state division of animal industry is the satisfactory use of practioners in area control and accredited herd work. Whether the state or the farmer or both should bear the expense and how much the veterinarian's fee should be are under discussion. —*From Report of the Maine Veterinary Medical Association, Dec. 18, 1942.*

• • •

Secretary Witter of the state association reports a meeting of southeastern veterinarians of the state Nov. 12, 1942 at the hospital of S. W. Stiles at Falmouth Foreside. Among the subjects discussed (says the reporter) were taxes, foot rot, submarines, enteritis of cats, and the hard cider ritual of Neolithic Maine. Despite a brand new visitation of stormy weather for which Casco Bay is famous "a good time was had."—*Ibid.*

New Jersey

State Association.—The 59th annual meeting of the Veterinary Medical Association of New Jersey was held at the Hotel Hildebrecht, Trenton, New Jersey, on January 14, 1943. Attendance was even larger than the average of recent years, indicating unusual interest in the program which was centered around efforts for conserving and augmenting our resources and supplies of foods and other products of animal origin. J. M. Herron presided at the evening dinner meeting and on behalf of the Association presented Dr. John B. Hopper of Ridgewood, N. J. with a citation in honor of 50 years of service in the veterinary profession. At a business meeting, the Association voted to a purchase a $500.00 War Bond. The following officers were elected: R. A. Hendershott, *president;* J. A. S. Millar, *first vice-president;* R. S. Huff, *second vice-president;* J. B. Engle, *treasurer;* J. R. Porteus, *secretary.* The speakers and their subjects were as follows:

Bert W. Bierer, U. S. BAI, Dover, Del.: "A Look at the Present and Post-War Status of State and Local Meat Inspection."

W. T. Thorp, Pennsylvania Agricultural Experiment Station, State College, Pa.: "Scours and Pneumonia of the Newborn Calf."

R. A. Hendershott, Chief, New Jersey BAI, Trenton, N. J.: "Bovine Mastitis—What the Department Offers the Veterinarians in the Way of Coöperation."

R. C. Miller, Pennsylvania State College, State College, Pa.: "Wartime Nutrition and Feeding Problems."

Gerry B. Schnelle, The Angell Memorial Animal Hospital, Boston, Mass.: "Therapy of Canine Distemper."

At the Association dinner held in the ballroom of the Hotel Hildebrecht, the address was given by the Hon. Harold B. Wells, judge of the New Jersey Court of Errors and Appeals.

s/J. R. PORTEUS, *Secretary.*

New York

Cornell's Thirty-fifth Annual Conference.—The thirty-fifth annual Cornell University veterinary conference was held January 6-8 at the New York State Veterinary College in Ithaca with 285 veterinarians attending. The guest speakers and their subjects were as follows:

E. R. Cushing, Plainfield, N. J.: "General Veterinary Practice without a Hospital."

A. L. Brown, Albany, N. Y.: "Pullorum

Control and the Practitioner's Part in the Program."

L. W. Goodman, Manhasset, L. I.: "Summer Headache."

D. F. Green, Rahway, N. J.: "The Fundamentals of Sulfonamide Therapy."

Charles Rife, Atlanta, Ga.: "Some Requisites of a Successful Practitioner."

E. V. Moore, Cortland, N. Y.: "Public Relations in Veterinary Practice."

B. T. Simms, Auburn, Ala.: "Bovine Coccidiosis and Recent Studies in Control of Gastrointestinal Parasites in Large Animals."

G. H. Hopson, New York City: "The Newer Science of Producing High Quality Milk."

R. N. Shaw, Shrewsbury, Mass., Coöperative Livestock Disease Control."

W. W. Dimock, Lexington, Ky.: Horse and Mule Production."

J. F. Shigley, State College, Pa.: "Pneumonia in Calves."

The members of the Veterinary College and the New York State College of Agriculture who presented papers at the conference follow:

H. H. Dukes: "Some Physiological Demonstrations on the Dog."

H. J. Milks: "The New Pharmacopeia."

A. G. Danks: "Swine Diseases."

W. S. Stone: "Brucellosis in Swine."

D. H. Udall: "Treatment of Mastitis."

E. S. Guthrie: "The Causes and Significance of Bad Flavors in Milk."

D. W. Baker: "Flukes of Cattle in New York State."

D. B. Johnstone-Wallace: "Pasture Improvement and Management Practices in Relation to Veterinary Science."

R. R. Birch: "The Infectivity of Brucella Strain 19 for Cattle of Breeding Age."

The Cornell University Veterinary Alumni Association held its annual dinner and meeting with 175 in attendance. P. P. Levine editor of the *Cornell Veterinarian,* reported on the publication for the past year. The new officers elected were: A. L. Brown, Albany N. Y., *president;* Charles Rife, Atlanta, Ga.; *vice-president;* and D. W. Baker, Ithaca, *secretary-treasurer.*

The program consisted of the following: Discussions of diseases of swine, sheep, horses, cattle, and small animals.

At the conference banquet W. W. Dimock, president of the AVMA, spoke on his experience as a veterinarian. All who were present found it especially interesting, and the younger men learned about conditions with which the earlier practitioners had to contend.

s/W. S. Stone, *reporter.*

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Awards for Clinical Reports.—Herman Stark, prominent New York City practitioner, has donated $500 to the New York City Veterinary Medical Society to be awarded annually for a period of ten years to members who submit the best clinical report before the Society. Meanwhile, the fund being invested in War Bonds serves a dual purpose: the advancement of clinical veterinary medicine and the strafing of the country's despoilers.

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Medical Times is hopeful that the new Governor of New York, gang buster and symbol of law enforcement, will prosecute the chiropractors who are practicing medicine in violation of the Medical Practice Act.

Wisconsin

State Medical Society.—At the annual (1942) meeting of the Wisconsin State Medical Society, the following resolution was passed: *Resolved,* that the House of Delegates of the State Medical Society of Wisconsin go on record by giving its approval to natural dairy butter in preference to any artificial substitute.

The resolution was based on the opinion of competent scientists to the effect that butter contains a growth factor not possessed by substitutes.

U. S. GOVERNMENT

Government Restrictions on Dog Foods Imminent

On Monday, January 18, the Office of Agricultural War Relations (David Meeker, chairman) of the Food Distribution Administration, U. S. Department of Agriculture, held a meeting for representatives of manufacturers of pet animal foods. The purpose was to obtain facts regarding the probable effects should certain restrictions on the manufacture and sale of pet foods be imposed. Three points were to be determined:

1) The minimum total protein (animal and cereal) which would provide maintenance for dogs.

2) The absolute minimum of animal protein necessary for maintenance.

3) How to limit best the total tonnage of dog food to be produced in 1943, and the selection of a given period in 1941 or 1942 which could be taken as an equitable criterion.

These problems were considered by representatives from the following: United States Department of Agriculture and the Beltsville Research Center; the dog food industry; American Veterinary Medical Association; American Animal Hospital Association; Advisory Scientific Council to the Joint Committee on Foods; and the American Humane Association.

Following three hours of deliberation, those in attendance were advised by Mr. Meeker that an official order was being prepared and might

be expected at any time. Although the specific details to be embodied in the order were not announced, it is probable that 100 lb. of dry dog food will be permitted to contain not more than 22.5 per cent total protein (animal and cereal sources), of which not more than 7 to 8 per cent shall be from animal sources (meat and meat by-products, fish and fish by-products, milk and milk-products). With such a restriction on the use of vital ingredients and the freezing of the total tonnage of dog foods which can be produced, at least one very important problem is created. Will it be possible for manufacturers to prepare products which, when fed to adult dogs under average normal conditions, will maintain them in a fair state of nutrition and avoid actual or marked malnutrition?

A further explanation of the significance of this order will be published as soon as the official order becomes available.

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Further Restrictions On Alcohols.—General Preference Order M-30 (see the January, 1943 JOURNAL, p. 75) was further amended on Jan. 7, 1943 by the WPB so as to limit the amount of ethyl alcohol that may be used in the manufacture of rubbing alcohol compounds to 15 per cent of the amount used in the base period, July 1, 1940, through June 30, 1941. The purpose of the amendment is to prevent violation of the spirit of a provision of the order which permits sale of rubbing alcohol compounds only to those holding prescriptions written by licensed physicians, veterinarians and dentists, and for certain other uses.

Because of increased demands for military requirements, methyl alcohol, or methanol, was placed under complete allocation effective January 15 by the issuance of General Preference Order M-31 as amended by the WPB and announced on January 7.

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Licensed Biological Products and Producers

As a licensure agency, the United States Public Health Service performs the same function for human medicine as the United States Bureau of Animal Industry does for the veterinary branch. A recent issue of *Public Health Reports* (Nov. 20, 1942) publishes a list of the establishments licensed and of products for which licenses have been issued by the public health service, that is, for use in human medicine. Fifty-six domestic and five foreign laboratories are named, together with the hundreds of products they produce. Among these firms are 12 well-known makers of veterinary products. Two of the 12 are mainly known as veterinary laboratories but they have been licensed to produce for human use such agents as tetanus antitoxin, botulinus antitoxin, rabies vaccine, tetanus toxoid, antianthrax serum, normal horse serum, and several others less generally employed in animals. As the supervision includes the laboratory and personnel as well as the products, the recognition speaks well for the quality of biological preparations employed in animal medicine.

World War II differs from previous wars in the number of technicians in various branches of science needed by the Army, Navy, Air Forces, and the industries. Physicians, dentists, veterinarians, and engineers beyond military age are mentioned among the personnel of this type needed to carry on with maximum efficiency, but avoiding dislocation of necessary civilian pursuits is not being overlooked, reports indicate.

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Restriction on Vitamin C.—Ascorbic acid (Vitamin C) was placed under allocation control today through the issuance by the Director General for Operations of general preference order M-269.

Development of the use of vitamin C in food and medicinal production for the armed forces was the primary cause for the action, as production was formerly geared to meet pharmaceutical needs. Present production does not meet current estimated requirements, and although production capacity is being increased, demands for 1943 probably will be more than double the 1942 figures. Enough will be available, however, for essential civilian use.

Vitamin C is used both by the armed forces and civilians in the prevention and treatment of scurvy, and other deficiency diseases caused by lack of sufficient quantities of this vitamin. The quartermaster corps is using large quantities in "K" and"Jungle" rations, and there is also a substantial demand for Lend-Lease requirements.

Sorbitol, recently placed under allocation control, is one of the principal raw materials needed for the production of vitamin C.

State Board Examinations

Alabama—The Alabama Veterinary Medical Examining Board will have a special called meeting in the old veterinary building, March 5-6, 1943, Auburn, Alabama, for the purpose of holding examinations for obtaining licenses and transacting such other business as may come before the Board.

Massachusetts—The Massachusetts State Board of Veterinary Examiners will hold examinations for registration in veterinary medicine May 18-19, 1943 at the State House, Boston, Mass.

Nebraska—The Nebraska Bureau of Examining Boards will hold examinations in veterinary medicine February 4-5, 1943, State Capitol Bldg., Lincoln, Neb. Applications for this examination must be filed with the Bureau at least 15 days prior to said date.

DEATHS

Budd William Coons (C.V.C., '15), 60 years old, Lisbon, N. Dak., died Nov. 19, 1942, at Madison, Minn., while visiting his sister. He had practiced in Lisbon from the time of his graduation in 1915, more than a quarter of a century. Dr. Coons was a member of the Minnesota and North Dakota veterinary associations. He joined the AVMA in 1922.

H. H. Hamner (Ala. Poly. Inst. '19), 45 years old, Montgomery, Ala., died Dec. 8, 1942 in Birmingham. He was born in Gordon, Ala., in 1897. After finishing college he served in World War I, after which he entered practice at Russellville in his home state. In 1923 he entered the U. S. Bureau of Animal Industry and served continuously until his death, at which time he was assistant to the inspector-in-charge of meat and milk inspection in Alabama. He was a member of the AVMA.

Frank Hare (K.S.C. '20), 49 years old, Lexington, Ky., died Nov. 26, 1942. He was born in Dawn, Mo., Sept. 2, 1893. Dr. Hare served in the Army during World War I and for three years was in charge of the experiment station in Santo Domingo, where he introduced American breeds of cattle to that island and worked out improvements in feeding, crop rotation and disease control. He had practiced in Lexington for the past 11 years, specializing in diseases of horses.

Howard Judson Hearrington (St. Joseph V.C., '19), 56 years old, Lexington, Mo., died Oct. 31, 1942. He served on the faculty of the St. Joseph Veterinary College for a period of years, was a sanitary and dairy inspector, and a past president of the Missouri Veterinary Medical Association. He joined the AVMA in 1919.

W. F. Hoehner (C.V.C. '02), 63 years old, Belleville, Ill., died Dec. 28, 1942. Dr. Hoehner was born in Belleville and was the first veterinarian in that city, having practiced there 40 years.

Walter L. Martin (K.C.V.C. '11), 70 years old, St. Louis, Mo., died July 12, 1942. He was born August 21, 1872 at Highland, Kans. He had been associated with the U. S. Bureau of Animal Industry, from which service he had been retired at the time of his death. He was a member of the AVMA.

William B. McGrath (U.S.C.V.S. '18), 62 years old, Washington, D.C. died Dec. 23, 1942. Dr. McGrath had been superintendent of the farm and dairy of the U. S. Soldier's Home in Washington for 38 years. The herd has the distinction of being the No. 1 tuberculosis-free accredited herd in the United States, receiving the certificate in February, 1918. Dr. McGrath was a member of the District of Columbia Veterinary Medical Association and of the AVMA.

Harry H. Sheeler (S. C. of Wash. '21), 61 years old, Huntington Park, Calif., died in September, 1942. He was born Feb. 18, 1881 at Pittsburgh, Pa. Dr. Sheeler had been engaged in the California state meat inspection service for several years, and had been a member of the AVMA since 1917.

COMING MEETINGS

Alabama Veterinary Medical Association. Alabama Polytechnic Institute, Auburn. Feb. 3-5, 1943. I. S. McAdory, Auburn, chairman.

Connecticut Veterinary Medical Association. Bond Hotel, Hartford, Conn., Feb. 3, 1943. Geo. E. Corwin, Lock Box 53, Suffield, Conn., secretary-treasurer.

Nebraska State Veterinary Medical Association, Lincoln, Neb., Feb. 4-5, 1943. S. W. Phillips, David City, Neb., program chairman.

Louisiania Veterinary Medical Association. Louisiana State University, Baton Rouge, Feb. 10, 11, 1943. C. M. Heflin, Baton Rouge, secretary-treasurer.

Southeastern Michigan Veterinary Medical Association. Meeting at 3919 John R. Street, Detroit, Mich., March 10, 1943. F. D. Egan, 17422 Woodward, Detroit, Mich., secretary.

Eastern Iowa Veterinary Medical Association. Hotel Montrose, Cedar Rapids. Oct. 12-13, 1943. R. E. Elson, Vinton, secretary.

Corrigendum

Kansas Veterinary Medical Association meeting which was held in Manhattan Jan. 11-12, 1943 was erroneously reported as canceled in the January Journal.

Meetings Postponed or Cancelled

Houston Veterinary Medical Association. Archie Stallings, 801 Waugh Drive, Houston, Texas, secretary. Meetings for the Houston Association have been postponed for the duration.

South Dakota Veterinary Medical Association. J. T. McGilvray, R. R. No. 3, Sioux Falls, S. Dak., secretary-treasurer. Meetings for the South Dakota Association have been postponed for the duration.

Virginia State Veterinary Medical Association. E. P. Johnson, Box 593, Blacksburg, Va., secretary. Winter meetings have been postponed.

Wisconsin Veterinary Medical Association. B. A. Beach, University of Wisconsin, Madison, Wis., secretary. Annual (winter) meeting canceled.

Mississippi Veterinary Medical Association. H. C. Simmons, secretary-treasurer. The 1943 meeting has been postponed indefinitely.

THE VETERINARY PROFESSION AND THE WAR

Selective Service Bulletin on Physicians, Dentists, Veterinarians, Osteopaths, Students and Preprofessional Students

The following bulletin has been circulated under date of Dec. 14, 1942 by the national headquarters of the Selective Service System to all secretaries of service boards:

1. *Persons Qualified.*—There are certain persons trained, qualified or skilled in the practice of medicine, dentistry, veterinary medicine and osteopathy who, if engaged in the practice of their respective professions, are in a position to perform vital service in activities essential to war production and to the support of the war effort and in activities the maintenance of which is necessary to the health, safety and welfare of the nation.

2. *Critical Occupations.*—The War Manpower Commission has certified that in the practice of medicine, dentistry, veterinary medicine and osteopathy, and in training and preparation therefor, there are critical occupations which, for the proper discharge of the duties involved, require a high degree of training, qualification or skill. In the accompanying tabulation is a list of "critical occupations" in medicine, dentistry, veterinary medicine, and osteopathy.

3. *Consideration of Occupational Classification.*—The War Manpower Commission has certified that there are serious shortages of persons trained, qualified or skilled to engage in these critical occupations. Accordingly, careful consideration for occupational classification should be given to all persons trained, qualified or skilled in these critical occupations and engaged in activities essential to the health, safety and welfare necessary to war production and essential to the support of the war effort, and persons in training and preparation therefor.

4. *Students in Preprofessional Training.*—A registrant who is in training and preparation as a premedical, predental, preveterinary or preosteopathic student, pursuing courses in liberal arts or sciences in a recognized university or college, may be considered for occupational deferment after completion of his first academic year in such preprofessional course, and thereafter if he is a full time student in good standing, if he continues to maintain good standing in such course of study and if it is certified by the institution that he is competent and that he gives promise of successful completion of such course of study and acquiring the necessary degree of training, qualification or skill.

5. *Students in Professional Schools.* A registrant who is in training and preparation as a medical, dental, veterinary or osteopathic student in a recognized medical school, dental school, school of veterinary medicine or school of osteopathy shall be considered for occupational classification during the period of such professional course, provided he is a full time student in good standing, he continues to maintain good standing in such course of study and if it is certified by the institution that he is competent and that he gives promise of the successful completion of such course of study and acquiring the necessary degree of training, qualification or skill to become a recognized medical doctor, dentist, doctor of veterinary medicine or osteopath.

6. *Interns.*—A registrant who has completed his preprofessional and professional training and preparation as a medical doctor, dentist or osteopath, and who is undertaking further studies in a hospital, institution or dental clinic giving a recognized internship, shall be considered for occupational classification so long as he continues the internship but for a period not to exceed one complete year.

7. *Opportunity to Engage in Profession.*—When a registrant has completed his training and preparation in a recognized college or university, or in a recognized hospital, institution or dental clinic, and has acquired the high degree of training, qualification or skill in one of these professional fields, such registrant should then be given the opportunity to become engaged in the practice of his profession in the armed forces, or in a civilian activity necessary to the public health, safety or welfare necessary to war production, or essential to the support of the war effort. In many instances following graduation from a recog-

nized college or university, or the completion of an internship, a certain period of time will be required in the placing of such persons in an essential activity. When a registrant has been deferred as a necessary man in order to complete his training and preparation, it is only logical that his deferment should continue until he has had an opportunity to put his professional training and skill to use in the best interest of the nation. Accordingly, following graduation in any of these professional fields or following an internship, a registrant should be considered for further occupational classification for a period of not to exceed sixty days in order that he may have an opportunity to engage in a critical occupation of his profession in the armed forces, war production, support of the war effort, or in an activity essential to civilian health, safety or welfare, provided that during such period the registrant is making an honest and diligent effort to become so engaged.

8. *Deferment Permitted Whether or Not Commission is Pending.*—The official statement of any recognized premedical, predental, preveterinary or preosteopathic college or university, the official statement of any recognized medical, dental, veterinary or osteopathic college or university, or the official statement of any hospital, institution or dental clinic giving a recognized internship, showing that a registrant satisfied the requirements of this bulletin, shall be sufficient for the consideration of such registrant for occupational classification on occupational grounds solely. Registrants will be considered for occupational classification as prescribed in this bulletin without regard for the fact that a commission in the armed forces may be granted to him or is pending.

9. *Procurement and Assignment Service.*—In order that every doctor, dentist or veterinarian may render the greatest professional service to the nation, the President has created the Procurement and Assignment Service for the purpose of gathering information with respect to the supply of qualified medical doctors, dentists and doctors of veterinary medicine. To work with headquarters of the Procurement and Assignment Service, there have been appointed for each state and the District of Columbia a state chairman for medical doctors, a state chairman for dentists and a state chairman for doctors of veterinary medicine. When considering the classification of any registrant who is a medical doctor, dentist or doctor of veterinary medicine, the director of Selective Service desires that local boards, through the state director, shall consult with the respective state chairman of the Procurement and Assignment Service.

10. *List of State Chairmen.*—Names and addresses of the respective state chairmen of the Procurement and Assignment Service will be provided to state directors from time to time.

11. *Effective Period of This Bulletin.*—This bulletin is effective until July 1, 1943, unless sooner amended. During the effective period of this bulletin the War Manpower Commission is giving further study to the training and preparation and utilization of persons trained in these professional fields.

LEWIS B. HERSHEY, *Director*

CRITICAL OCCUPATIONS: MEDICAL, DENTAL, VETERINARY AND OSTEOPATHIC

Preprofessional student after completion of his first academic year in such preprofessional course:
- Premedical
- Predental
- Preveterinary
- Preosteopathic

Professional students during full professional course following completion of preprofessional course:
- Medical
- Dental
- Veterinary
- Osteopathic

Intern in hospital, institution or dental clinic, giving recognized internship following completion of professional studies:
- Medical interns
- Dental interns
- Osteopathic interns

Persons engaged in practice of their respective professions:
- Medical doctors
- Dentists
- Doctors of veterinary medicine (engaged in care of animals raised and maintained for work or food or in the inspection of meat food products)
- Osteopaths

Appeals Procedure—Procurement and Assignment Service

For Physicians, Dentists and Veterinarians

The directing board of the Procurement and Assignment Service has issued the following appeals procedure for individual physicians, dentists and veterinarians, and for employers thereof, to all state chairmen:

The responsibility for the initial decision as to whether an individual physician, dentist or veterinarian is to be considered essential in his present situation or available for service elsewhere rests with the respective state committees. The local, county or district committees may serve in an advisory capacity to the state committee, but the authority to make decisions rests with the state committees.

If an individual physician, dentist or veterinarian or the institution employing him does not agree with the decision of the state chairman as to his availability for service elsewhere, the individual or his employing agency may request a reconsideration of the decision by the state committee. If the original opinion is upheld by this committee, appeal may be made to

the corps area chairman and his committee. In this event the corps area chairman should request all information available from both the state committee and the person himself, and the corps area committee should appraise the situation and render a written decision to both the state chairman and the individual concerned.

If the decision of the state committee is still sustained by the corps area committee, the individual concerned or his employer has the further privilege of submitting his case to the central office of the Procurement and Assignment Service. When this is done the central office will assemble all pertinent information from the individual, his employer and the state and corps area committees concerned and present this for action to the directing board or to a special committee of the board in case a decision is necessary before the next board meeting. In such circumstances, this committee shall report the case and its decision to the board at its next meeting.

ODT Recommendations on Wartime Conventions

"Abandonment of meetings and conventions that will not contribute in an important way to winning the war" was urged by the Office of Defense Transportation, in a statement from Director Joseph B. Eastman, dated Dec. 15, 1942, replying to many requests for an expression of its attitude toward the holding of conventions during 1943. Quoting further, the Director goes on to say:

"Numerous groups have already canceled conventions scheduled for the coming holiday period or for the early months of next year. Others have asked whether meetings due to be held in 1943 may not be considered sufficiently important in relation to the war effort to justify going ahead with their plans. Still others have inquired whether holding a convention at a particular city or at a particular time would seriously overburden transportation facilities.

"The Office of Defense Transportation obviously cannot undertake to assess the essentiality of each of the many thousands of meetings and conventions normally held in the United States every year. It is a responsibility of the officers or members of individual associations to make their decisions, bearing in mind the burdens now imposed on the Nation's transportation systems in the conduct of transportation's share of the war program.

"I suggest that in considering the question they ask themselves whether the proposed meeting or convention will contribute in an important way to the winning of the war. In other words, will the gathering help to shorten the war? If the answer is no, I strongly urge that the convention plans be abandoned.

"I realize that I am proposing a difficult test, one which few organizations can pass, but the war demands on our transportation facilities call for this test.

"The sacrifices which the war effort requires may be illustrated by a few examples. It will be agreed that medical science is a subject of more than usual importance in wartime. Yet the American Medical Association and several other medical groups have canceled their conventions. Many scientific, educational, and professional bodies, which had planned convention sessions devoted largely to war and post-war problems, have taken similar action. Their number includes the American Association for the Advancement of Science, the American Sociological Society, the American Association of University Professors, the American Society for Public Administration, and numerous others.

POSTPONING CONVENTIONS DESIRABLE

(Headline ours)

"I must emphasize once more that no easing of the burden on transportation lines is now in sight. On the contrary, the load is constantly growing heavier. War production will be gaining its full stride in 1943, requiring the carriers not only to haul more freight but to transport more passengers on essential war business.

"Troop movements by rail, which a few months ago amounted to a million men a month, have now doubled to a rate of approximately two million a month. They will no doubt be even larger in 1943 as more men are put in uniform and more are moved in training and embarkation points. Regular trains will be more crowded than ever with soldiers, sailors, and airmen on furlough.

"Approximately one-half of all the Pullman cars in the country are now engaged in troop movements, and a large percentage of railroad coaches are similarly occupied every day. These movements and increased civilian travel have raised railroad passenger traffic, in the country as a whole, to a level more than 50 per cent above that of a year ago. In some regions there has been a rise of more than 100 per cent. Passenger traffic on the bus lines, in the country as a whole, is up over 80 per cent.

"Very little additional equipment has been or will be made available to handle these huge additional loads. No new railroad passenger cars, and very few new motor buses, will be built in 1943. The carriers must do their job, a bigger job than in 1942, with virtually no more equipment than that already on hand.

"It should be clear, I think, that the railroads and bus lines will have extremely limited facilities in 1943 for passengers not in the

armed services or not on business of an essential or emergency character.

"In view of this fact, it should be clear also that every convention or meeting canceled, even if it would have involved travel by only a comparatively small number of persons, will mean a decidedly worthwhile saving of transportation facilities and will itself constitute a contribution to the war effort."

Medical Care for Civilians

Every effort to furnish adequate medical care for civilians was promised by Paul V. McNutt, Chairman, War Manpower Commission, in a statement released on Jan. 10, 1943. Mr. McNutt said that recent reports indicated that this result can be achieved.

The Chairman's statement was based on a report by Dr. Frank H. Lahey, Chairman of the Directing Board, Procurement and Assignment Service for Physicians, Dentists, and Veterinarians, which is a part of the WMC.

Some physicians, Dr. Lahey indicated, will be asked to volunteer for practice in areas other than those in which they are now located. This will be done to assure at least a minimum standard of medical care. It is hoped that in most instances, relocation of a physician can be accomplished within the states in which he is now licensed.

"In order to obtain greater mobility of physicians, however," he said, "some method of temporary licensing for the duration will probably have to be arranged in some states."

More than 400 physicians have already been relocated, he said. The names of other physicians who are willing to be and who can be relocated are being submitted to the Procurement and Assignment Service. In addition, the United States Public Health Service and the Procurement and Assignment Service are making careful studies of industrial and other critical areas where relatively large numbers of physicians are needed or will be needed.

The total number of American physicians, Dr. Lahey stated, is approximately 180,000. In estimating the availability of physicians for civilian or military service, certain adjustments are made for: (1) lessened effectiveness of those over 65; (2) number of physicians giving full-time service in certain governmental and private agencies; (3) numbers now acting as residents and house officers.

It is believed that the medical needs of the armed forces in 1943 can be met by an additional 10,000 physicians, Dr. Lahey said. "But this withdrawal," he added "will leave more than 80,000 active civilian physicians, which is a sufficient number to care for the needs of the civil population, if these men and women are properly distributed and allocated, and if civilians will take every possible health precaution in order to keep well."

The distribution of physicians, according to Dr. Lahey, was unequal before recruitment for the armed services. The prewar average number of civilians to each practitioner was 1,000. As recruiting progressed, the ratio of civilian population per practitioner increased to 1,400 on Nov. 30, 1942.

When the military medical quotas were developed for 1942, due allowance was made for the inequalities in prewar distribution of physicians, and quotas for such states as Alabama and Mississippi were made relatively small, while New York was asked to surrender 38.6 per cent of its active private practitioners to the armed services. While the planned withdrawal of physicians has tended to even up some of the inequalities in distribution, voluntary enlistments have, in certain states, served to emphasize prewar maldistribution.

Recruiting in 1943 will be confined to states with a disproportionately large number of physicians, according to Dr. Lahey.

At the present time the following states show shortages of physicians: Alabama, Arizona, Arkansas, Colorado, Georgia, Idaho, Kentucky, Louisiana, Mississippi, New Mexico, North Carolina, South Carolina, South Dakota, Tennessee, West Virginia.

According to Dr. Lahey, some states have worked out comprehensive systems for increasing the patient load and area coverage to be assumed by the physicians who remain in civilian practice.

There is much that civilians can do to assist doctors to meet the present situation, he said. All should follow these general rules:

1. Keep healthy. Get plenty of sleep, eat the proper foods, get plenty of fresh air, exercise, and recreation.

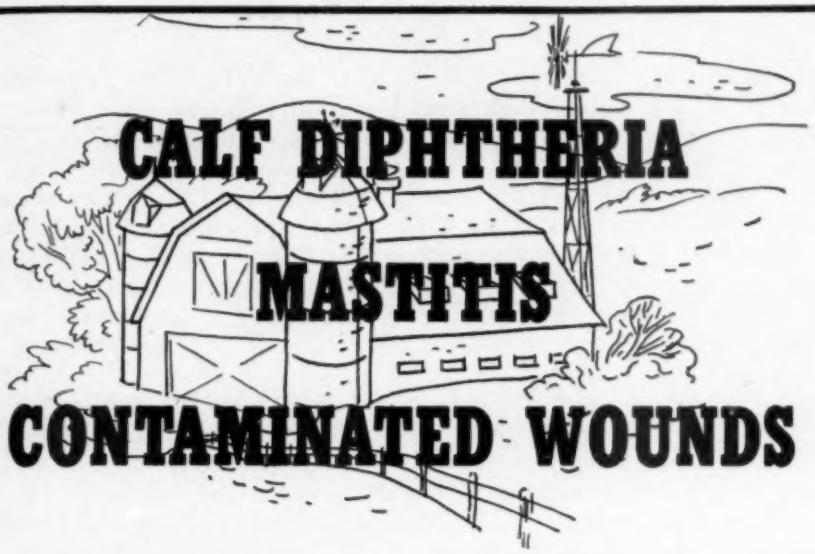
2. Avoid unnecessary demands on the physician's time whenever possible; go to his office during office hours instead of asking him to call upon you at your home.

3. In case of really serious illness, DO NOT DELAY in calling your doctor or calling at his office. It will save his time, if he is called promptly in any case of acute illness. This is not a contradiction of point 2. It does, however, assume that the average citizen has good judgment. In doubtful cases, call the doctor at once.

4. Avail yourself of opportunities to study first-aid, in order to know how to give care to the injured until such time as a doctor can take over.

5. In connection with point 1, if you do not know the basic rules of nutrition, avail yourself of opportunities to learn the facts.

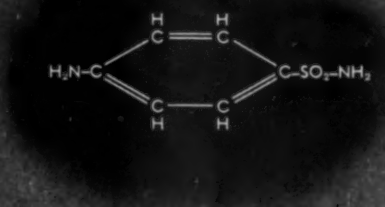
Salt sprinkled as a thin layer over the mash of chicks is the best preventive of cannibalism. Two or three such treatments suffice in broods where cannibalism occurs. Overcrowding must also be corrected.



CALF DIPHTHERIA
MASTITIS
CONTAMINATED WOUNDS

● The value of the sulfonamide drugs as "specifics" in veterinary medicine has not yet been fully determined, nevertheless, sulfapyridine has been found of specific value in calf diphtheria; sulfanilamide in bovine mastitis; and the sulfonamides, singly or in mixture, in the treatment of contaminated wounds.

For Victory: Buy War Savings Bonds and Stamps



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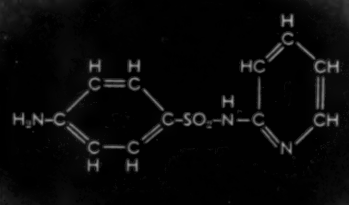

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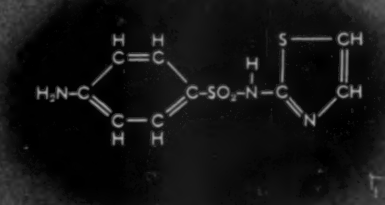

SULFATHIAZOLE

MERCK & CO., INC. *Manufacturing Chemists* **RAHWAY, N. J.**

make the world tremble at our feet.

There's more to military training than learning the bugle calls and sighting along the barrel before pulling the trigger. While snappy marching, martial music, paper work, guard duty, religious services, and recreation are pre-educational requirements for the course on military science, the big picture is something that none but the experienced soldier will ever understand. But we have to live with our politicians, nevertheless.

According to radio commentators and others, everything will be hunky dory after the war: bull terriers sleeping with rabbits, wolves and lambs basking in the sunshine, and *liberté, fraternité, egalité* raining from the sky, along with the four freedoms. Date not set.

The choice is between enslavement and freedom. There will be no in-between result of *this* war.

Getting What One Pays For

A country which has never entertained even the thought of planning for war, and which was defeating for office any candidate who dared to whisper about a planned wartime program suddenly goes to whining about not having this and not having that for the prosecution of a war of such magnitude that it is beyond all human comprehension. Donald Nelson, famously broad-minded and far-seeing in the field of big business, says it all in a few well-chosen words: "The program is so vast that no human eye can see all the facets." Otherwise stated, the men at the top like the boys in training have much to learn and they must learn it in a hurry—while narrow minds stay home and spout a deluge of words without meaning. Our progress in this war seems to be excellent—considering.

The optic nerve contains from 800,000 to 1,000,000 fibers.—*Pathfinder.*

In Bloats and Gastric Colic

Use

ARMOUR'S ADCA TABLETS

Armour's ADCA Tablets are indicated in the treatment of many types of indigestion... Bloats... Gastric Colic... etc.

They provide a balanced combination of four antiferment and carminative agents of established effectiveness. ADCA Tablets provide exact dosage and easy administration.

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"PRODUCTS OF DEPENDABILITY...
PREPARED FOR THE VETERINARY PROFESSION"

Keep them Rolling
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Issued Under Date of

October 1940
January 1941
July 1942

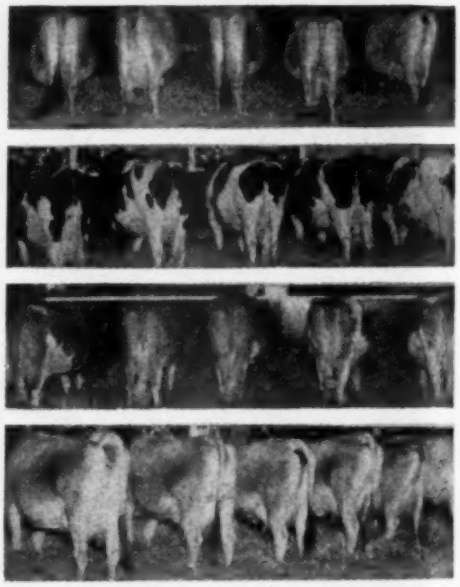
AMERICAN VETERINARY MEDICAL ASSOCIATION
600 S. Michigan Chicago, Ill.

An' Related Topics

Improving Texas Dairy Herds

The South has made definite progress in the development of the dairy cattle industry since cattle ticks were systematically eradicated. While the transformation is striking in every one of the southern states, Texas and Mississippi are outstanding in this respect. The Jersey, popular breed of the South, has probably made the greatest gains, although the other dairy breeds are

Successors of the Texas Longhorns



They reign where the ticks once ruled, thanks to the researches and police work of the United States Bureau of Animal Industry—to Salmon, Smith, Curtice, and Kilbourne.

not being neglected. Says *Texas Cattleman*, "Continued effort in herd and quality improvement is rapidly focusing attention of the nation's dairy industry on Texas. Increasing demands for dairy products to meet Army lend-lease and defense worker demands creates a most pleasant picture of the Texas dairy cattle industry." Merchants, bankers, business men, farmers, and dairymen are sponsoring cattle improvement throughout the South and Southwest to an extent that would not have been dreamed of preceding the campaign against the tick-carrier of Texas fever.

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An' Related Topics

The Cainozoic Biped: Man

The surviving biped of the mammalian class, now fighting all over the planet Earth for who-knows-what belongs to the family Hominidae, genus Homo, and species sapiens. There have been three species of Homo: *H. heidelbergensis, H. neanderthalensis,* and *H. sapiens* which is "we." The word seems to be derived from *sapere* meaning wise or something like that. Had the coiners of the word been wise enough to foresee the doing of 1943, they would perhaps have lopped off the last four letters of the word. The first two species *(loc. cit.)* have shuffled off and the last may be on the way out. He's living up to the first three letters of his name.

Oh, yes, we've heard of the Cro-Magnards, the Azilians of the Reindeer Age and the Grimaldi folk of the prehistoric days and all that, but this is not a thesis on Palaeozoic strata. It's just a talk on human behavior in 1943.

The American Red Cross coöperating with Harvard University have built a complete hospital of nine wards in the southern part of England. Its entire personnel are American volunteers. Every particle of the building and the equipment were shipped from the United States, says the London correspondent to the Journal of the American Medical Association.

The kennel column of the *Cleveland News* states that Nazi officials have conscripted all dogs in Holland that are over 18 inches high and contrasts the incident with the American way of procuring dogs for the Army.—*From Dog World.*

The Axis is not short of weapons nor of highly trained men to use them, but it has no monopoly on the lipids, proteins and carbohydrates essential to the winning of the war. These are what the veterinary service helps to provide.

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Bacto-Agar is a purified Agar prepared from domestic material. In the manufacture of Bacto-Agar the extraneous matter, pigmented portions and salts are reduced to a minimum.

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Le Briquet

Says the OWI *re* matches: "A match may be just something one can get for nothing and a novel form of advertising but to a soldier stranded in a distant outpost or in the front lines, it's likely to be something very much else again."

In World War I the use of matches was forbidden. In the first place, matches flash like signals and in the second place, there were no matches. Soldiers used *"le briquet,"* a gadget of flint, thumb wheel of roughened steel and a wick of punk (or something)—not so good in wet weather.

Here's a personal platform: Detest all things which tend to prevent unity and all acts and words which discourage the commanders of the soldiers and sailors shedding their blood for you and me in many parts of the world.

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The World of Today and Yesterday

The way of the world for centuries has been for the strong to lend money to the weak and make themselves hated by trying to collect, the while trading with the weak on terms which seldom improve their lot. It hasn't worked. The "have nots" eventually get a leader who "sunders the bonds of debt"—that is, welshes—discovers ersatz materials for what his country lacks, arms his people and jumps on the "haves"—who have become soft and indolent. True, the "haves" generally wake up in time, and their superior resources generally win the war. But winning wars settles nothing. For in a generation or so it has to be done over again.—*Excerpt from an editorial in The Chicago Sun—(Headline ours.)*

King of Animal By-Products: Leather

"Imagine if you can," says the *Cattleman*, "a procession of 20 million cattle, 14 million calves, 50 [?] million goats, 35 million sheep, and almost 2 million horses and various numbers of such animals as kangaroos, alligators, lizards, snakes, ostriches, seals, and even sharks. The collection of all these hides and skins is an absorbing lesson in geography."

But, most of the leather is a by-product of domestic animals, a by-product of the use of these for human food. While there are some animals in the foregoing list that are caught and killed for their hides, they make up but a small proportion of the total of the leather needed by mankind.

Though classified as fur rather than as leather, the common integument of the furbearers is, in fact, leather. It differs only in being tanned with hair on, instead of after depilation.

IN CANKER
OTORRHEA
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Veterinary Division THE DOHO CHEMICAL CORPORATION NEW YORK - MONTREAL - LONDON

FEBRUARY

The month of broken resolutions is here.

* * *

But our pledge for '43 remains unchanged.

QUOTE:

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An' Related Topics

To Be or Not to Be

When the Bard of Avon, back in the seventeenth century, inscribed that famous soliloquy for his Danish hero to stage, "to be or not to be" was not as big a "mouthful" as in 1943. Whether a thing is to be or not is quite a question now, all the way from helpless children of conquered populations to the strongest of countries. Nations, men, women, business, schools, colleges, savings, comfort, pleasure, happiness, clubs, sports, societies, reading matter, and life itself, may or may not *be* in the coming days.

Nineteen forty-three is a year of uncertainty. Whether you'll have it or whether you won't, whether you'll be here or whether you won't seems to depend upon how high you can lift your head above political parties and selfish interest. The yardstick of 1943 foresight is the unity of moral and material support given to the fighting forces, their officers and men, shedding their blood in the four corners of the world. If they make mistakes, the fault may be yours. You got what you have without training men how to guard it. You thought you were saving money but were you? Administration and command of a large military and naval force has to be learned just as you had to learn what you are doing, and you did not learn that in a day or a month or a year.

Watch Your Hematic Hootch Values

According to a decision handed down by the Supreme Court of Iowa, in the case of *State vs. Haner*, when a man has 400 mg. per 100 cc. of alcohol in his blood, he's drunk. The defendant was convicted of operating an automobile while intoxicated and appealed in vain to the higher courts for acquittal. Remember the formula "400 mg/100 cm^3" and keep the percentage down around 0 mg./1,000,000.

When the meat shortage gets beyond the talking stage, why not try the recipe of Marie Antoinette?

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Dean, Veterinary Faculty

An' Related Topics

To organize, meaning to act in concert, is the vitamin of this period of world's history. In the operations of veterinary science, deficiency of this factor crops up in many ways and places. The cure lies in the hands of the nonmembers of organized veterinary medicine.

War is not dysgenic in the physical sense. It may be a means of preserving nations having the best brains and the best bodies, but that has nothing whatsoever to do with survival of the fine minds civilizations had hoped to create. The definition of "survival of the fittest" depends upon who does the defining.

The area of Russia, not counting occupied Poland, is 8,819,791 square miles. All Europe, including Iceland, has but 4,093,000 square miles.

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An' Related Topics

I Told You So

Comes the *maintes* complaints about priorities on farm machinery needed to produce more food, along with shortage of many things required to make war material—both excellent "I-told-you-so's" for the growlers of coming days. Going to battle without arms is *not so good.* Neither is shortage of things to eat. So, which?

Sphygmos (= Pulse)

While fluctuations in blood pressure have little clinical value in veterinary medicine for reasons too numerous to mention here, the main satisfaction is that we do not have to remember the tongue twisters of the art —sphygmomanometer, sphygmomanometroscope, sphygmodynamometer, sphygmobolometer, sphygmo this and sphygmo that, all of which could be blitzed out of the dictionary and never missed. The expert sphygmotechnologists, otherwise known as doctors of medicine, use 'em on the arm but not on the tongue.

"Education as Usual"

"Education as Usual" is as impossible as "Business as Usual," during total war. Americans in Paris in 1918 will recall that schools and colleges were closed "for the duration." So, what lies ahead for education in the United States is problematical. To presume that regular students will take the usual courses under regular teachers is logical only if the war is short and manpower is not dislocated too much.

The recent announcement that Tulane University would soon become a training school and notifying the faculty to seek other jobs reminds one of the artillery parked on the campus of Alfort during World War I.

Everywhere in the press one is reminded that the war will be the making of a new world; which is the equivalent to confessing that things were not just right before it started.

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An' Related Topics

Dogs on Guard Duty

Eric, a handsome German Shepherd, is anxious to do his duty. He is one of a group of dogs which arrived recently at Camp Robinson and Camp Chaffee, along with their 4 trainers who will remain at

Signal Corps Photo

Eric, one of the Army Dogs Training for Guard Duty at Camp Robinson and Camp Chaffee in Arkansas.

the camp. The animals are so well trained that any soldier or civilian who attempts to move furtively within sight or sound of the dogs gets a growl instantly. The dogs are allergic to women as well as men who act suspiciously. The Army is using these splendidly trained dogs for guard duty in many places, especially at German and Japanese prison camps. They accompany the guards on their tours, assisting with their keen ears—ears much keener than man's. Pfc. Elbert W. Shepard, Benton, Ark., who is holding Eric on the leash, recently completed the special Army course in training dogs.

Dupes or partisans of Goebbel's system of divide-and-conquer go about telling that "Hitler is licked to a frazzle; the war will be over in March; so why buy War Bonds and Stamps?"

Message from Captain Judy

From the holiday greetings of *Dog World*, received too late for the pre-holiday issues, we quote:—

"Make new friends but keep the old;
The first are silver, the latter gold."

In reply we borrow from Henry Fielding:

"When I'm not thanked at all, I'm thanked enough,
"I've done my duty, and I've done no more."

To this we should add that we have always found *Dog World* "A friend in need, is a friend indeed."

Horses in the Battle of Stalingrad

The cavalry charge of the Germans at Stalingrad, mentioned in the official communiques, comes as a warning to the advocates of an all-mechanized army for the winning of this war. On the other hand, claiming that animals can draw wheels as fast as detachments of men can march, does not paint the right picture, either. Deadlocked armies don't march. They hide and dodge and crawl and sneak along, and something on wheels or someone on foot must bring up the food and "pass the ammunition." The deadlock may last for hours, for days, for weeks, or for months as was the case at Verdun and Stalingrad. When the story of the latter siege is written, there will be animals to write about, as there was for Verdun. The slow advances on the Western Front (1914-1918) are not all forgotten.

Military Training

Genus Omne Americanus seems to be the victim of the super-zenith of heretical stupidity written into pages of American history by W. J. Bryan, silver-tongued orator of the Platte, when he sounded off with "A million men will spring to arms over night" if any one as much as dared to thumb their nose at the United States. That, thought the s.t.o. of Nebraska, would

RACTICAL CONTROL OF RABIES

There is adequate evidence both from the field of clinical experience and from scientific research (North American Veterinarian, March 1942, pages 186-192) that one properly administered injection of an adequate amount of potent rabies vaccine immunizes dogs against rabies.

Every scientific body in the world which has made a careful study of rabies control has recommended vaccination of dogs combined with appropriate sanitary police measures in those areas where infection is known to exist.

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Minimum dose	5 cc
Dogs between 25 and 50 lbs. weight	1 cc for each 5 lbs. weight
Dogs over 50 lbs. weight	10 to 15 cc

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